

## A Kinetic and Mechanistic study of the Effect of the Substituent on the Rate of Reduction of $PX-ArTeCl_3$

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الخلاصة:

تمت دراسة تأثير المجاميع المعوضة على معدل سرعة اختزال المركبات  $PX-ArTeCl_3$  (X=H, OH, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>) حركياً. لوحظ ان الاختزال يتبع قانون سرعة التفاعل من الدرجة الثانية وكذلك معادلة هاممت، وقد كان من الدرجة الاولى لكل من العامل المؤكسد والعامل المختزال. كما تم حساب قيم كل من معدل سرع التفاعلات وقيم  $\delta_p$ . لقد وجد ان معدل سرع الاختزال يزداد على النحو التالي:-



ان سير ميكانيكية التفاعل يتاثر لدرجة كبيرة بواسطة التأثير الحثي للمجموعة المعوضة.

Summery:

The effect of the substituent on the rate of reduction of  $PX-ArTeCl_3$  (X=H, OH, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>) has been investigated kinetically. The reduction obeys a second order rate law and hammett equation, it is a first order in each of the oxidizing and reducing agents. The rate and  $\delta_p$  Values of the reaction have been determined. It is found that the rate of reduction increases in the order,  $H \ll OH < OCH_3 < OC_2H_5$ .

The pathes of the reaction mechanism is affected largely by the substituent's inductive effect.

Introduction:

The reduction of aryltelluriumtrihalide with different reducing agents have been reported (1) very little informations concerning the Kinetic and mechanistic study of the preparation of the organotelluriumtrihalides is available in the literature (2-7). Recently some interest has been given to the alkoxy group in the para position to (Te-Cl<sub>3</sub>) to give a better understanding of the common

preparative routes to diarylditellurides,  $R_2Te_2$ , because they are useful intermediates for the synthesis of some classes of organotellurium compounds(8).

In this paper it has been attempted to investigate the effect of the alkoxy group on the rate of the reduction of  $PX-ArTeCl_3$  ( $X=H, OH, OCH_3, OC_2H_5$ ). The effect of other conditions were reported. The effects of the substituent on the reaction site have been extensively studied,(9) but very little attention has been given to arytellurium compounds. It is deduced that this is ascribed to the practical problems involved in making measurements. It was shown that the structure of the ethoxyphenyltelluriumtrichloride is squarepyramidal coordination with 4-ethoxy phenyl group in the apical position(10). The pyramids are linked in chains through Cis-basel chloride atoms, however other studies suggested that the structure is trigonal-bipyramidal with phenyl ring in the equatorial plane(11).

The compound present in the solution is mainly in the molecular form and the p-and d- orbitals of the  $TeCl_3$  group are not conjugated with the orbitals of the ring which is manifested in the absence of the mesomeric and interaction moment(11). Mcwhinnie suggested that the structure of  $phTeX_3$ . built up from donor acceptor interaction of  $X^-$  and  $(phTeX_2)^+$  (12).

This configuration may imply the susceptibility of reaction site to the nature of the substituent on the aromatic ring. It was shown that the Hammett reaction constant ( $\delta$ ) for the acid dissociation for several series of acids of the general form  $ArMO_nH_m$  ( $M=B, C, P, As$ ) affected decisively by polarizability(8) of M. The polarizability effect is also valid on the Te atom due to it's large volume and the distance between the outer most electrons of the atom and it's nucleus.

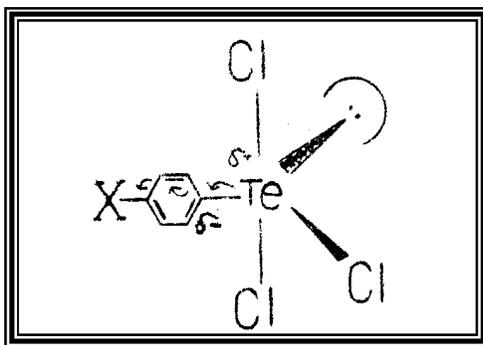
#### Results and Discussion:

All kinetic data were determined according to the derived equation mentioned in the literature (5). A plot of the logarithm of the rate constants against  $\delta_p$  values give a straight line (Fig 1). This confirms the application of Hammett equation on our reaction. Using Hammett equation, the data obtained for  $\delta_p$  values are positive (table 1).

These values are not consistent with Hammett  $\delta_p$  values(13), which are negative for para OH, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub> groups. This discrepancy might be related to different mechanistic routes affecting electron density at the site of the reaction. The reaction condition was fixed and the kinetic order of the reaction has been considered, so that in this work the chance of deviation from Hammett equation(8) it has been minimized

The  $\delta_p$  values found by Hammett for the dissociation of PX-ArCOOH (X=OH, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>) attributed largely to the mesomeric effect, which is capable of supplying unpaired electrons down the conjugated system of the bonds.

In this work it is believed that the changes in electrone density at the site of the reaction were affected merely by the inductive effect. It has also been ruled out the mesomeric effect because the results of dipole moment measurements on a series of aryltelluriumtrichlorides indicated that conjugation between the P&d orbitals of Tellurium atom and the ring  $\pi$  – orbitals does not exist. These data are consisted with the results obtained, since the change in para groups from OH to OC<sub>2</sub>H<sub>5</sub> show no decreasing effect on the rate of the reaction (Fig 1). In addition to those data, the results of this work consist with Hammett findings when the groups OH, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub> are in meta position, where no presence for the mesomeric effect is detected. These results also show that the inductive effect increases in the order H<<OH<OCH<sub>3</sub><OC<sub>2</sub>H<sub>5</sub>, this gradual increase of the inductive effect may be ascribed, to the attraction of electrons by phenyl ring which is enhanced by the substituent inductive effect. This effect will decrease the overlap of electrone density between Te-Cl atoms. On the other hand this effect will cause more overlap of the electrone density of the Te atom and C atom of phenyl group. This means that the increment (in the bond multiplicity) in the interaction between Te & C (phenyl) is on the account of the interaction between Te and Cl which facilitate the cleavage of the weak Te-Cl a donor acceptor type bond (12) in the rate determining step(5).



#### Alternativ

ely it may say that the decrease in elecrone density facilitates the nucleophilic attack on the Te atom by the  $\text{OH}^-$  of the mixed solvent, since the first step in this reaction is the hydrolysis of the arytelluriumtrihalide species by the water content mixed solvent which has been used as a medium of the reaction (5). This mechanism route has been suggested by other workers (2,15).

It has been observed that the difference in the rate of the hydrolysis of  $\text{PX-ArTeCl}_3$  in the order  $\text{OC}_2\text{H}_5 > \text{OCH}_3 > \text{OH} > \text{H}$ , but it could not be carried out kinetic measurements to provide data for tabulation. These observations consist with the results for the reduction of  $\text{PX-ArTeCl}_3$  which imply that the inductive effect of the substituent facilitate the cleavage of the Te-Cl bond.

#### Experimental:

Aryltelluriumtrihalides were prepared according to the literature(16). The reduction of this species by different reducing agent are widely documented(1). The solution of the ditelluride in aqueous 1,4 dioxane (1:5 v/v) obey the Beer-Lambert's law. The solute was monitored at 400 nm., because there is no other species in this system which show absorption at this wave(5). The reaction followed spectrophotometrically using a pye-unicam sp8-400. 1,4 dioxane was purified and redistilled before use according to the literature method(17). All solutions of sodium sulphite and arytelluriumtrichloride were freshly prepared before use. The mixed solvent of aqueous 1,4 dioxane (1:5 v/v) was used in this kinetic

investigation because the reaction mixture remained homogeneous and relatively adequate to follow kinetically.

Table 1:

Variation in rate constant with the different substituents in para position of ArTeCl<sub>3</sub> at 25 C in dioxane/water (5:1 v:v).

Substituent	K <sub>r</sub> /dm <sup>3</sup> mol <sup>-1</sup> s <sup>-1</sup>	Log K <sub>r</sub>	δ <sub>p</sub>
H	3.6x10 <sup>-2</sup>	-1.444	-
OH	0.5	-0.301	+1.14
OCH <sub>3</sub>	0.8	-0.097	+1.35
OC <sub>2</sub> H <sub>5</sub>	1.5	0.176	+1.65

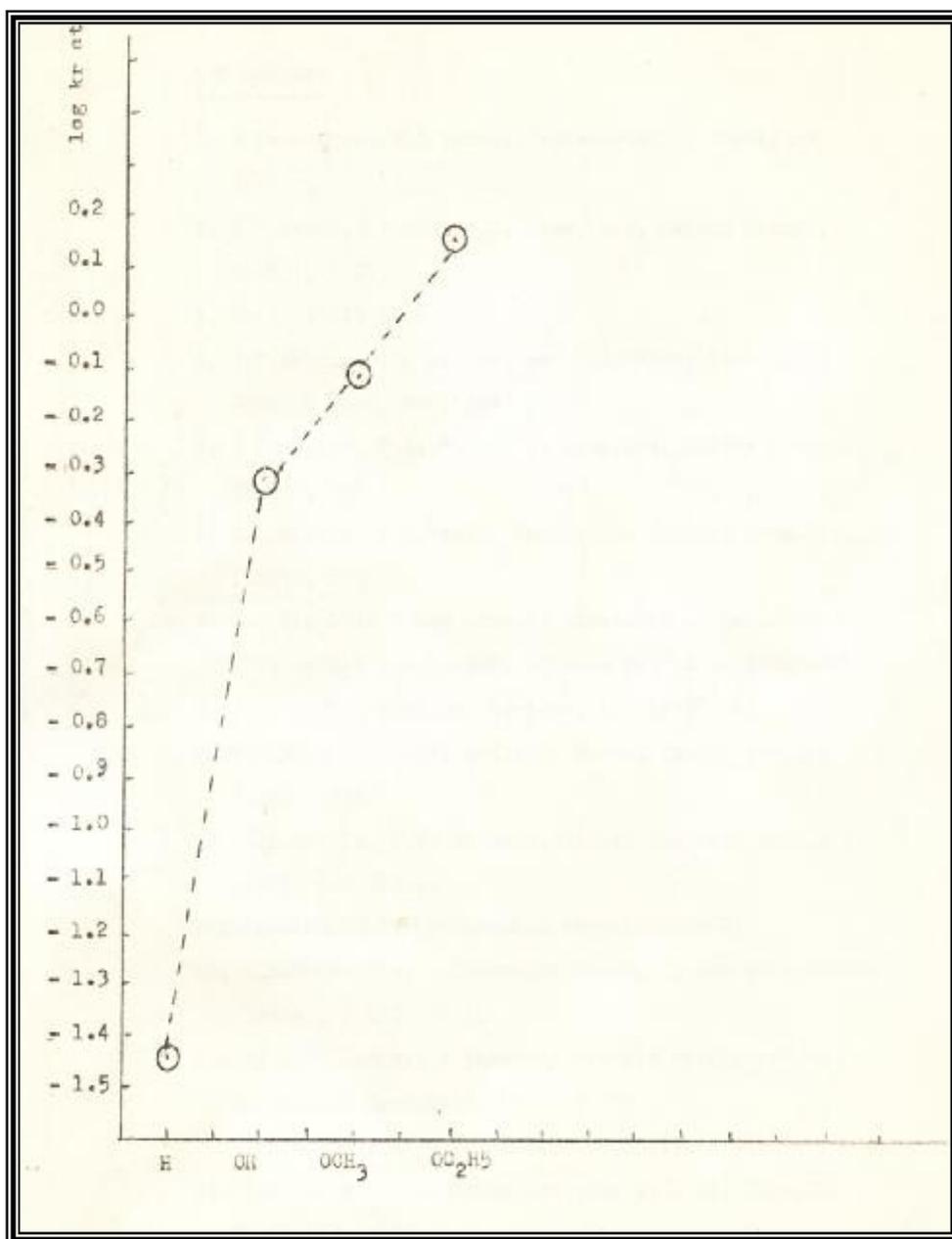


Fig (1): Effect of the substituent upon the rates of the reduction of the aryltelluriumtrichlorides in dioxane/water (5:1 v:v) at 25 C.

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## A Linguistics Analysis of Dummy subject It

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### 1.1 Introduction

The term reference has already been used to contrast with denotation. It is also used in a useful, but wider sense, to contrast with sense, to distinguish between two very different, though related, aspects of meaning.

Reference deals with the relationship between the linguistic element, words, sentences, etc. and the non - linguistic world of experience. Sense relates to the complex system of relationship that holds between The linguistic elements themselves, it is concerned only with intra – linguistic relations. (Palmer, 1988: 30).

Perhaps, the most interesting linguistic phenomenon of all is the idea. That we have to recognize the unity of English sentence, paragraph and even a text partly by the grammatical structure of clause and sentence , but more important , by its semantic integrity , by cohesive relation between an element in the text and some other element which is crucial to the interpretation of it.(Trotter,1980 :109). Thus, Hallilay and Hassan (1976:2)state that a text as well as a sentence are both semantic and grammatical Units.

Accordingly, reference is one type by which we can achieve what is called cohesion. So reference is a semantic relation (identification or comparison) between a reference item and its referent, e.g., pronoun, whose primary function is deictic (exophoric reference to the context of situation), have a secondary (endphoric) function of referring backward (anaphoric usage) or rarely , forward (cataphoric usage) (ibid:9).

This paper tries to analyses the Dummy subjects It linguistically with paying a great attention to great linguists' considerations.

### 1.2 What is a Dummy Term?

Dummy is a term used in linguistics to refer to a formal grammatical element introduced into a structure or an analysis to ensure that a grammatical sentence is produced. A part from their formal role, “Dummy elements” have no meaning – they are semantically empty, e.g., there in “There were many people at the club.” it in “it’s raining.”. When this element acts as a locus for grammatical contrasts, it is referred to as a “ dummy carrier” ,e.g., do in question forms is a “dummy auxiliary” , which carrier the Tense/Number contrast for the verb phrase (do/did you know , do/does he know). Notions involving zero (e.g. “zero morpheme”) could also be considered types of dummy. In Transformational grammar, “ dummy symbols” are sometimes introduced into the deep structure of a sentence , to facilitate the derivation of classes of sentence , but they never appear in the sentences surface structure , e.g. the various kinds of boundary symbol , or the delta (▲) symbol which acts as a “ place – holder” for lexical items (specified as complex symbol).

( Lyons (1968 : 85)) , Crystal (1988 : 103)).

### 1.3 ALinguisticStudy of Dummy Subject“it”

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Our teacher in grade school taught us that all pronouns must have an antecedent, but we can’t figure out how there can be an antecedent in :

*it’s raining*

*It’s shining.... Etc.*

We can’t find an antecedent in It’s raining as well as in It’s shining . What Miss Fidditch (2004,94) states that referential pronouns have to have an antecedent. But not all pronoun usage is referential. Pronouns are not always atomic, meaningful words like book and keep, quite often they’re ionized for use as pieces of grammar. Like the – s in *bookkeepers*.

Thomson and Martinet (1988) in different pages remark that all the common contractions with subject it are really grammar marking:

It’s meaning [ it is] Progressive or Passive

It’s meaning [ it has ] Perfect

It'd	meaning [it would]	Conditional
It'd	meaning [ it had ]	Pluperfect
It'll	meaning [ it will ]	Future

English is the kind of language (an “analytic” or “positional” language) that has most of its grammar concerned with word order, which word to use, prepositions and pronouns and “little words” and how they’re organized. In a word, syntax.

Languages farther toward : the “synthetic” end of the analytic – synthetic axis, (e.g. German , Spanish, Latin , Homeric, Greek, Sanskrit, Navaho, Lushootseed, and Inuit) tend to use more and more affixes and other form – changing kinds of grammar (in a word, Morphology) , and syntax is less and less important in them(Miss Fidditch, *ibid.*).

Quirk , et. al, (1989 : 1302) mention that Morphology and syntax are, respectively , the internal economy of words , and together they make up Grammar.

Let us guess, so what about *It’s raining?*. Quirk, et al, (*ibid.*) state that *It’s* it’s a kind of construction called a Dummy it . That is , the it has no meaning what- soever and is used strictly as a placeholder.

English syntax has this rule that says .... in ponderous and self – enforcing tones ..... *Thou Shalt Have A subject In Every Finite Sentence.*

Ordinarily, Fidditch (2004: *ibid*) said that subject is some noun or referential pronoun that is the salient agent or experience or patient of whatever the verbal predicate refers to:

- a. the writer in     He wrote it.
- b.             the hearer     in                             He     heard     it.
- c.             the hurter     in                             He     hurt     it.

But, this falls down when dealing with some predicates. Rain is a superb example. Rain is a thing and an event, both nouny and verby. In using it as a verb, we must endow it with a subject, But it’s already its own subject, self – activity. (Quirk, etal., 1989 : 1307) .

Thus, we have to distinguish between it in “its raining” as others called it “weather it” from “Distance it” as in:

a. It's a long way to Baghdad.

Or Extra position it in.

b. It's important to me that she be present.

which is related by a syntactic rule called Extraposition to

c. That she be present is important to me.

(Quirk, et al. 1989).

And there are other Dummies as well, like the there in:

d. There is a unicorn in the garden.

or It in.

e. Why don't we do it in the road?

Dummy words, placeholders are fairly common in analytic languages.

As we have mentioned, previously, "it's raining" it's a kind of construction called a Dummy "it". That is "it" has no meaning whatsoever. So how about

"'s raining?"

's raining / s renIng / is one way of many that we can pronounce *It's raining*. (Roach, 1985). The beginning of a sentence, especially if it's predictable and meaning-free, is a frequent place for sound loss in pronunciation. Others of this type include:

a. Never see that a gain [I'll deleted]

b. Daughter's on the phone, Bob. [your deleted]

c. Never been there. [I've deleted]

Generally Speaking, we are probably not right to identify 's raining with *Is raining*. That's an /s/ , not a /z/ ; that is , we would not say /z renIng/. But is has a /z/ , not an /s/ , and it shows up in fast speech rules when it really means is. For instance , if we meant to say He's reading and we were in a hurry , we'd say /z ridIng/, not /s ridIng/ . So the contraction is just that... a shortening of a predictable sentence part.

There is a fact, said that " language change". Language change is both unconscious and social, not conscious and individual . Miss Fedditch (2004, 98) remarks:

Rather, someone got into the habit of saying  
" The weather is rainy" or " The weather is  
raining" or possible " The sky is raining today"  
( in some pre-modern form or another).And ,

over the year, that became shortened and shortened, to the form we see today: “It’s raining.” In other hand, *it’s raining* means either the weather is rainy or the sky is raining. And this way of thinking, like all ways of thinking, is optional.

### Conclusions

To sum up, a Dummy subject obeying the letter but not the spirit of the Rule.

Language, indeed, changes in that the concept of weather “it” and Distance “it” came along to be mutated into current form “it’s raining”, i.e., we don’t think assigning a name or recognizing a null value in the sentence matters much, because the sentence we use today is not the sentence that prompted original use of the pronoun or its antecedent. Moreover, we have to pay attention to the point of “stress” or what is called stress–time for it helps delimit constructions, and so on. But it sure teaches English speakers how to get rid of unnecessary unstressed syllables, which they do with great abandon.

According to “it’s raining” it isn’t a referential pronoun, because I think, and the descriptivist thinks, too, that the reference in “it’s raining” was dropped before that particular descriptivist was born.

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**Orientalism , the Magic of East , and its Inspiration  
on E. M. Forster's *A Passage to India***

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**Abstract**

No doubt that western scholarly works keep debt to the eastern culture .Tales ,stories and traditions all embody oriental ideas from the most distant east . It is the world that influenced much on English literature and literary writers who are , with respect to this influence ,allured of the magic of the oriental thoughts and meanings . Love , passion , magic , imagination , fancy, and other lovely expressions are the main meals in the menu of orientalism that most western writers crave to tackle in their works that consequently opened the way for further studies in the inspiration of orientalism throughout the ages .

This paper aims to shed light on Orientalism as the inspiration of east to westernwriters and how they function this inspiration with its rich material in presenting their own works without distortion or falsification for the oriental ideals .

Actually , to clarify this aim , the research is divided into three sections. The firstsection deals with the morals ,values ,and the identity of Orientalism . The second section tackles orientalism as an inspiration of humanistic relations , while the third section is about the reflection of orientalism on E. M. Forster's *A Passage to India* .

**Section One : Morals , Values , and Identity of Orientalism .**

The medieval Arabic literature displays most exalted moral ideas, the deepest reverence for all things connected with its religion and identity . This literature is proud of fate and fortune to include them in its fields even in days of comparative degeneration and local decay. In fact, it is shaped with unlimited humanity and charity for

the poor, unconditional forgiveness, generosity and liberality which all exalt kindly deeds of oriental base. These features are considered the foundation of the Arabic society and indeed the very purpose of its existence. Values of such a culture influenced the stories and even the folktales of other cultures. Courage, honesty, honor, hospitality, generosity, and loyalty are all emphasized. Moreover, the hero is defined by characteristics such as pride , bravery in war, protecting the weak , and helping the poor .

The supernatural element is a very important aspect in oriental literature. Jinn, Ifreet , Giants and Angels are some of the supernatural creatures that appear frequently and sometimes suddenly as in the example of this research A Passage to India .

Mostly in oriental tales , there are two kinds of forces that control human beings ; good forces including God and angels , and evil forces as jinn . In addition, oriental narratives lack elements of logic. Events might be clearly presented, but sometimes little details that clarify parts of the story are missing. For instance, in The Arabian Nights, the tale of The Clever Hassan the hero suddenly possesses a magic ring that helps him in his troubles. There is no mentioning where the ring came from or why Hassan did not use it before.

On the other hand, oriental stories have morals that teach the reader lessons. They present common morals as patience is the key for success, satisfaction and contentment keep out of troubles, loyalty is always rewarded , and stealing is usually discovered and punished . These lessons are meant to enhance and preserve the set of values that comprise oriental culture and make it distinctive.

However, any serious academic attempt to deal with orientalism and its influence on English literature is bound to Edward Said's Orientalism (1977) that shows there is no more doubt that western scholarly works in almost all fields of study particularly literature keep debt to the eastern culture . In early times and later, the east had a lot to offer to the west perhaps the greatest gift of all was Christianity that pulled England and the west in general from ages of darkness .

Scholars go on in asserting that orientalism served to enhance the quite knowledge about Islam and the eastern world. This acquaintance may strengthen the resemblance rather than difference between Moslems and Christians as the dogmatic, liturgical and moral bases of the two religions. To study orientalism means to come close to this special part of the world for thi cultural richness though the first concern is not literary but rather political and religious . Eighteenth-century England used the term "Orient" to describe the Middle East, Asia and Africa in which these regions were involved in the commercial ventures that would become nineteenth-century imperialism (WWW.Thorn) . Consequently, the political concern dealt with the social and literally concerns that described in a way or another the real oriental people. Western scholarly works tried to make use of the oriental tales that paved the way to know much about east. No doubt that the tales of The Arabian Nights, which introduced into England in 1704 through the translation of Antoine Galland's French version of the original, included fantasies, social critiques, and eastern morals serving the narrative and intellectual activities of the western desire.

Indeed, oriental material appeared in the literary works of scholars who liberated themselves from the predominant political and religious prejudice against the east and who sought a great treasure in understanding such a culture of that distant part of the world throughout the ages . They declared that the importance of getting knowledge of the eastern nations minds helps to reach perfection and to open a new and ample field for speculation. Definitely, this declaration offers a more extensive insight into the history of eastern figure and a new set of images that future scholars might imitate.

The admiration of the east as the sacred land and as an exotic world of wonder and wisdom was deeply rooted in the western mentality . Actually, to westerners, the east represents an existing exotic mystery by itself, liberating them from the chains of classical traditions and satisfying the west's urge for exotic experience. Simply,

it stands as the free flight of the imagination outside the restrictive classical rules. East provides those who are concerned with it with a sense of wonder and strangeness. Magic and supernaturalism mingled with beauty is often the stimulant that affects this sense. This side of world is in fact a place of mysterious conflicts and opposites as the rediscovery of oneself and the world, a resurgence of wonder and freedom and an attempt to break the limitations of the traditional to go beyond it forgetting time and space and paying no attention to the traditional religious and political life. Besides, the orient represents emotion, primitive nature and powerful passion that show the wild inner sense of man to move freely either in actual reality or on the wings of imagination.

On the other hand, no one can deny the great impact of orientalism on romanticism in which the first was a powerful shaper of the second (W.W. Oueijan) . To the romantics, the east was a model world of exoticism and the birthplace of almost all ancient civilizations and of heavenly religions, particularly Judaism, Christianity, and Islam.

In fact , the tide between romanticism and east became so strong through several literary writers went a head by fully integrating eastern material into their works shaping their imagination with exoticism instead of merely using it as decoration.

Orientalism in romantic poetry , however , became an essential inspiration for the people of east were the source of exoticism and mystery by themselves . The symbolism of exotic people is represented by the artistic exploration of places and ages to fly unlimitedly. In Book V of The Prelude, the orient inspires William Wordsworth with a sense of wonder and strangeness, when by the seashore reading a book, he passes into a dream, in which he finds himself in a waterless sea , a desert , and beholds an Arab Bedouin who bears a stone and a shell in his hands . The stone is to be a book of "geometric truth" and the shell is a book of poetry which prophesies the destruction of the world by a deluge (Ibid) . While the supernatural world was embodied by Samuel Taylor Coleridge's eastern visionary

poem Kubla Khan . In fact it shows the power of thoughts and imagination that man has . In Ozymandias Shelley insisted to show some ideas as remoteness, iniquity and wonder to reveal the emptiness of pomp and false power borrowed from a historic eastern figure to reach a high level of awareness. Yet, the most distinguished contributions to the promotion of orientalism within the scope of romantic poets were Lord Byron's contribution. In his Childe Harold's Pilgrimage Byron showed his quest towards exoticism and mystery. He found in east the power, wisdom, and life that provide images of beauty. This images though they are primitive, yet lively and beautiful creating a world of allure and strong passion that frees him from formal life of England.

These well-known figures lived the most elementary unsophisticated passionate moments that reminded them that anything and everything is possible in the world and provided them with a more vivid sentiment of the wonders of nature, a more a cute consciousness of the self. To the romantists , orientalism means the returning to the originality coming close to the depth of their souls to discover the true identities . It is the wonderful world of contradictions motivated scholars to discover the hidden beauty and oddity of a culture, which still has much to offer.

#### Section Two: Orientalism ; the Inspiration of Humanistic Relations

Some writers have adapted the general orientalist traditions to realize their own desires and purposes. According to them, as to E. M. Forster , orientalism is associated with their quest for homo-erotic love . They look upon it as a means of escaping from a painful state of mind and an oppressive society in which the male friendship is condemned and associated with crime, disease and sin. (Bakshi, 28)

Between 1885 and 1967 all homosexual acts were illegal under Section II of the 1885 Criminal Law Amendment Act , known as the Labouchere Amendment .Hence , " against this context of intolerance homosexuals were forced to look outside English society for places and ideas more conducive to male friendship" (Ibid , 29).

Consequently, the journey to the East, where friendships based on

sympathy and sincerity rather than on rules of conduct of the Western conventional society, provides such many British writers as E. M. Forster with a sense of release from social and religious taboos that repress passion . They abandon their countries and escape their conventional society in which the virtues of male friendship are unobtainable to the orient countries where they can find the emotional life, the simplicity, love, and the ideal of male friendship. Thus, it is not able that "The Orient was overvalued for its pantheism, its spirituality, its stability, its longevity it primitivity, and so forth

Section Three: The Reflection of Orientalism on E. M. Forster's *A Passage to India*.

It is an essential fact that E. M. Forster , a contemporary English novelist ,deals mainly with middle Eastern themes , he understands the East , India in particular for it fulfils his homo-erotic quests . His first real contact with India was in the form of Syed Ross Masood , the grandson of the distinguished reformer Sir Syed Ahmed Khan , who was the founder of the Muslim Anglo-Oriental College in Aligarh. This relationship had its impact on Foster and inspired him to write *A Passage to India*:

My connection with India is peculiar and personal .

It started because I made friends an Indian, but for him I might never have gone to his country , or Written about it. His name was Masood ...

(Quoted in Bakshi, 35)

*A Passage to India*, like all Forster's novels, displays his creed for personal relation and Forster himself asserts this fact:

**It is on the basis of personal relationship that my**

connection with that strange country rests . I didn't go there to govern it or to make money or to improve people . I went there to see a friend ... the sense of racial tension ,of incompatibility , never left me . It was not a tourist's outing and the impression it left was deep .

(Ibid)

Within this context, Forster emphasizes the fact that many of the racial and psychological barriers, dividing men from one another, are attributed to "the rigid conventions and narrow prejudices shown by man with developed hearts "(Varshney ,44). Forster shows his admiration for those who are not bound by such conventions and prejudices and are willing to follow their hearts and impulses in reaching out towards one another. He uses the political circumstances to heighten his awareness of incompatibility and barriers to love between men .

Consequently, the political situation provides Forster with a pretext of the British .in India and gives him an opportunity for projecting his theme of friendship. Therefore, Forster constantly strives in his Indian novel to put politics in perspective and carefully negotiate a space for homo-erotic desire .One can say that "Forster's orientalism is merely a device for advancing the theme of homo-erotic love, and is not ultimately its dominant discourse"(Bakshi ,34).

Obviously , the title was borrowed from Whiteman's delightful poem *Passage to India* (1871) . Whiteman composed his poem to celebrate the opening of the Suez Canal in 1869 , in addition to other scientific achievements ; he saw the canal , by linking Europe to Africa and Asia by the shortest route , as the culmination of world communication (Ibid)

While Whiteman conducted his spiritual tourism to more than India , Forster under took his longest journey to India physically and spiritually . He went there on two visits before writing his Indian novel , and came back equipped with the needed prerequisites for the monumental task . So *A Passage to India* frames the theme of friendship in the context of the British rule of India.

The central question of the novel is presented from the very beginning, " as to whether or not it is possible to be friends with an English man?"(PI ,5) . The obstacles to friendship between the Indians and the English are insurmountable in the political environment of India . Hamidullah , an old Indian man , argues that friendship is

possible in England . Whereas Mahmoud Ali , who has known the English only in India , says it is not . Hamidullah became distrustful and feel himself superior to the Indians . The English arrive in India intending to be gentlemen but are told by their countrymen that it will not do . This is only consistent with the character of Adela Quested , who expresses a wish to know Indians and "I only want to meet those Indians whom you (Mr. Turton) you come across socially—as your friend " (PI ,22) .

Adela comes to India in the company of an old woman, Mrs. Moore, the mother of her future husband, Ronny Heaslop , the City Magistrate . Forster shows in the case of Mrs.Moore and Miss Quested "how person of tolerance, good temper, kindness and sympathy, by standing a part from the herd emotions of prejudices and contempt, establish the sanctity and sanity of personal relationship in the face of the hysteria shown by the British " (Varshney ,59) . Being liberal, kindly and sympathetic women, they desire to make a remarkable friendship with the real Indians, ignoring considerations of race and warnings of the local Britishers who are contemptuous of this desire and think that there is nothing to know about Indians who are any way an inferior race. In fact the Anglo-Indian people, who used to live in exile for the sake of the British Empire, did not mingle with the indigenous Indian people. They believe, **like their** representative, the conscientious Ronny Heaslop that:

I am out here to work , mind , to hold this wretched country by force . I am not a missionary or a labor member or a vague sentimental sympathetic literary man...we're not pleasant in India , and we don't intend to be pleasant . We're something g more important to do.

(PI ,44)

Reacting against this attitude his mother , Mrs. Moore argues that "the English are out here to be pleasant" and she further adds :

Because India is part of the earth . And God put us on the earth in order to be pleasant to each other . God is

...love...God has put us on earth to love our neighbors  
and to show it , and He is omnipresent , even in India,  
to see how we are succeeding .

(PI ,45)

In spite of her son's warning about mixing too much with Indians, Mrs. Moore goes to the mosque one evening and gets into a conversation with Aziz , a young Muslim doctor who finds beauty and peace in the mosque . He shouts furiously that she should not be there but he has surprised to find she has removed her shoes. "Yes, I was right , was I not ? If I remove my shoes , I am allowed ?" (PI , 15) . This Anglo-Indian woman treats both Hinduism and Islam sympathetically and kindly . Mrs. Moore's situation stands for Forster's who is strongly in favor of Indian self-government . While Mrs. Turton , the virtual leader of the English woman in Chandrapore , can not tolerate those who can put up with Indians or think that they are worthy of mingling with the English ; if they do , like Mrs. Moore and Adela , they must not forget Mrs. Turton dictum : "You're superior to them , any way . Don't forget that . You're superior to any one in India except one or two of the Ranis [Indian Ladies] , and they're on an equality "(PI , 22-3) .

Being snob and the ideal of the Anglo-Indian woman, Mrs. Turton dislikes Cyril Fielding , the Government College Principal , for he is devoid of any radicalism , just like Adela and Mrs. Turton . That is why Mrs. Turton classifies him in a lower position than other Anglo-Indians "Mr. Fielding was not Pukka , and had better marry Miss Quested for she wasn't Pukka" (PI ,23) . As a man of a good heart and delicate nature, Mr. Fielding is different from the other Anglo-Indians. He tolerates and treats the Indian people very kindly ignoring the racial and political barriers that separate men from each other. "The world he [Fielding] believed, is a globe of men who are trying to reach one another and can best do by the help of good will plus culture and intelligence " (Ibid ,56) .

In fact, E. M. Forster tries repeatedly to pit the values of personal relations against the political factors that divide men. He, as a result, strives at every stage to dissociate friendship from politics. He makes

all the chief characters keep distance from the political situation in India and he depicts them as detached from the political scene of the novel. Aziz expresses his boring caused by the political discussions and says, "why talk about the English? Brrr.....? Why beeither either friends with the fellows or not friends? Let us shut them out and be jolly " (Ibid ,7) . Fielding shows the same weariness with political issues as Aziz : "There they were ! Politics again. It is a question I can't get mind onto, ...Iam out here personally because I needed a job. I cannot tell you why England is here or whether she ought to be here. It's beyond me " (Ibid, 103) .

It is significant that the theme of friendship in A Passage to India is associated with oriental characters belong to muslim culture that symbolized in the mosque, reflecting Forster's own love for Syed Ross Masood . This intimate friendship carries homo-erotic desire which is expressed clearly in the novel and becomes its main subject. Thus, Forster's emphasis on the friendship Aziz and Fielding is mainly illustrated in all the three parts of the novel which is divided into three parts. Each part has its significance and, according to Forster , corresponds to the Indian seasons of the year : Part One named Mosque deals especially with Muslim India ; it represents spring season and signifies " man's emotional nature " . Part Two named Cave represents summer season an d signifies " man's intellect "; while Part Three, The Temple, represents autumn and signifies man's "devotion of love" (Varshney ,44) .

Apparently, Forster's interest in the male friendship leads him to depict marriage as an upper most subject in the novel. He, as a result , emphasizes the supremacy of homo-erotic love which falls outside the boundaries of such conventional relationships as the marriage . In addition, homo-erotic desire in Forster is more concrete than the hollow conventions of marriage; marriage is allied to the pressures for propagation's but it alienates men from one another and their own true instincts (Bakshi ,46). Consequently, marriage according to Forster , separates men from one another and only through friendship can they come together . As a result of that, women characters do not participate in the novel's imagery of beauty and passion but rather the

light was shed on the physical beauty of male as shown in the first part of the novel when Forster presented Mrs. Moore as a very old woman and Adela as a plain flat-chest woman.

It seems that Forster's special love for male friendship came as a result of his love towards the fiery characteristics of oriental figures whose passion cannot be hidden and simplicity cannot be changed. The writer here finds something in this region of the world that couldn't be found there in west. He might find the real identity of human being that is distinguished by his instinct as a bond of passion and emotion. Such kind of magic orientalism gives to a lot of writers paves the way to go far with their imagination keeping real debt to the oriental influence.

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**The Theme of Loneliness in Harold Pinter's  
*The Caretaker***

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**Abstract**

It is generally known that the theme of loneliness is evident in Harold Pinter's *The Caretaker* (1959). The main characters of the play are often lonely either by an act of will , or rather due to some malign forces imposed on them .

The basic interest of this paper is to shed light on the theme of loneliness as reflected in Pinter's *The Caretaker*. Besides , the possibility to overcome one's lonely condition will be questioned as expressed through the situation of an old tramp and a mentally unbalanced man .

**1. The Shaping of Pinter's Sensibility**

Harold Pinter was born in Hackney , 1930 , the only child of a Jewish family descended from a Hungarian or probably Portuguese origin . He was then brought up and educated in that bleak suburb of the East End of London Which was at the time a good refuge for the Jewish People (Almansi and Henderson , 1983 : 10) . Pinter witnessed the Second World War with all its associated horror , but his life at home was completely undisturbed . At the age of eighteen , Pinter refused to be engaged in military Service mainly because of his hostile attitude towards war and violence . It turned out that the young Pinter , as an objector of the National Service , underwent two trials but fortunately he was not imprisoned (Ibid) .

However , Pinter's literary career could be accounted for in terms of two recognizable periods . The first started in 1949 when he joined the Royal Academy of Dramatic Art . But the atmosphere there did not appeal to him . It was at his feigning a nervous breakdown that he left the Academy quite unpleasantly only to initiate a new career as a repertory actor (Ibid) . During that period , Pinter had different inclinations . It was beside being an actor and a director that

Pinter wrote poetry, some of which was published in London magazines . The second period which marked the real turning point in Pinter's life , started in 1957 with Pinter's being acclaimed as a dramatist .The period was initiated with *The Room* , a play written in four acts at the request of a friend , to be followed by plays like *The Dumb Waiter , The Birthday Party and A Slight Ache* .

As a dramatist , Pinter's name has been associated with the theatre of the absurd with the latter consciously abandoning the rational devices and its pessimistic attitude towards man and his purposeless position in the world (Holman , 1985 : 3) . Pinter has his own message to the world but he is not totally bothered to preach it through his characters . Indeed , everything in his plays is two-sided that once a question is raised , different explanations are there not to be reduced to formula . His plays then are characterized by a sense of horror and fear which is at once a reflection of the violence Pinter himself experienced , as a Jew in the most miserable streets of the working class suburbs. Likewise , there are similar echoes of the horror and misery caused by the outbreak of the Second World War and afterwards bitterness .

Besides , a careful analysis of Pinter's Plays reveals that the "room" , being also a significant title of his first recognizable play , is almost a recurrent theme .The room ,being inhabited peacefully by some persons when all of a sudden the whole security of the room is threatened with the arrival of an intruder (Almansi and Henderson , 1983 : 51) .Man's plea to occupy a room , in this concern , becomes rather a manifestation of his similar plea to gain a foothold in the world .

No less important has been Pinter's concern with themes like man's loneliness , the crisis of losing one's identity and the lack of proper communication .

To sum up , Pinter's plays are many , the most recognizable to mention are : *Night School , The Collection , The Lover , Landscape , The Homecoming , Old Times , Monologue , No Man's Land , Betrayal , A kind of Alaska* and *Screen Plays* .

## **2. The Caretaker : An Introductory Note**

Among Pinter's so – called comedies of menace , *The Caretaker* ( 1959 ) received great critical acclaim . It established Pinter's reputation as a magnificent dramatist both in Britain and the world . Its significance stems from that it has dealt with different themes which are equally serious other than to stimulate merely the audience's laughter . Pinter himself has made it clear that his play is not intended to be only a “laughable farce”(Esslin , 1970 : 280) . It is true that the play is funny up to a point beyond which it ceases to be funny when “the absurdity of the characters' predicament becomes frightening , horrifying , pathetic and tragic” (Ibid) . It is , in this concern , that the comic and tragic elements are amazingly mingled with an atmosphere of fear and horror so that when laughter is raised , the audience are fully aware of what might follow .

It seems useful then to argue that the play can not be fully classified as a comedy . Indeed , it turns out that comedy is only a second concern and hardly emerges as a recognizable theme. It is simply a means by which the dramatist conveys his other important themes . Thus , one can safely say that the play is only a tragi – comedy . This can be especially true if we consider Pinter's similar tragi – comic attitude towards man himself and his position in the world .It becomes , there fore , a characteristic of Pinter's plays , and of *The Caretaker* in particular that the most serious themes are treated in a mixed attitude which is half – comic and half tragic .

Whatever Pinter's attitude could be , *The Caretaker* remains one of his best to be read on different levels. Though the play is written in three acts in which three characters alone are involved , its impact is tremendous that critics could find much to be written about Pinter and his play .

### **3. Loneliness as Reflected in Pinter's *The Caretaker***

In the simplest terms , *The Caretaker* presents a human situation in which three characters are involved : two brothers and a tramp .It emerges that the older brother ,Aston has rescued an old tramp, Davies , out of a furious quarrel in a café where the latter is supposed to be a cleaner . Soon , Davies' loneliness is focused on .Davies ,in his sixties , is only an outcast , a vagabond without the least sense of belonging . Indeed , he is not only deprived of a family ,

proper job and refuge , but also without a clear identity .Whereas his real name is “*Davies . MacDavies*” (Act 1,20) he has been assuming another name , Jenkins .As a matter of fact , Davies is deprived of his social rights , as an individual , since he is not the man he pretends to be . Davies or Jenkins , thus , keeps on alluding to the journey once he will , perhaps he must take to Sidcup , only “*to sort himself out*” ( Act 3, 65 ) . But this assumed journey is always hindered by his inadequacy to have a proper pair of shoes . Besides , the weather is never good enough to start ( Ibid ) .

Similarly , Davies’ account of a begging journey to a “*Monastery down at Luton*” ( Act 1, 13 ) emphasizes his loneliness that he is friendless and in some despair . Equally pathetic is his apparent poverty , to beg for a pair of shoes and his subsequent depression of not being given any by monks. Davies’ complaint of the inhuman treatment , he has had there , to be “*nothing better than a dog*” ( Ibid , 15 ) exemplifies the hostility he has been encountered with . It is not surprising , therefore , that Davies is constantly conscious of his low social status and is sensitive to think of others as superior to him . Instantly he storms at the Scotchman , denouncing his authority to give him orders , that “*he’s not my boss ... nothing superior to me*” ( Ibid , 10 ) . Likewise , Davies is no less conscious of his dirty outlook , which he tries desperately to cover up by claiming to have “*had dinner with the best*” ( Ibid , 9 ) . Evidently , Davies’ statement is questionable but it could be only a helpless expression to hide his apparent inadequacy .

However , it turns out that Aston , a young man in his thirties , has saved him when he was likely to be put to death . Obviously Aston is gentle , good-hearted and apt for help . He reacts with sympathy to offer the old tramp what he desperately strives for : a refuge , bed , shoes , etc . A careful interpretation of the theme in question reveals a parallel between Aston’s situation and Davies’ . Indeed , both are equally lonely , though for different reasons , are no less desperate in their yearning for a proper companionship . Soon , it emerges that Aston is “*mentally deranged*” ( Gascoigne , 1974 : 207 ) and could hardly achieve manual things. In this regard , Aston is revealed as the one who has suffered . He is the one whose artistic

inclinations and clear insights have been reduced to conformity . Indeed , there was a time when Aston was fully energetic , equally sensitive to look at things through the eyes of a promising artist ( Esslin , 1968 : 282 ) . But that does not go for long . Society has persecuted Aston once by judging him mad , practicing science on his brain to render him normal ( Brown and Harris , 1972 : 29 ) .

Unlike Davies who trusts nobody and rather “ remains cocooned within himself ” ( Cowell , 1967 : 134 ) , Aston used to be quite open with people . He , thus , keeps on talking to them , perhaps to the degree of hallucination , thinking that they are lending a serious listening: “ *They [ people in the factory] used to listen . I thought ...they understood what I said ... I talked too much .That was my mistake* ” ( Act 2, 54 ) .

But , he has been paid the worst . The vague mentioning of Aston’s mother , in this concern , increases his misery . In his predicament , Aston appealed to his mother pleading for help , lest he should undergo a loathsome operation on his brain , but “*she signed their [psychiatrists’] forms giving them permission*”( Ibid ) .In the absence of motherly care , Aston has been subjected to the horror of the mental hospital . It is true that the electric shock , he had there , has freed him from hallucination but left him as “*a slow worker* ” ( Ibid , 49 ) and less witty to grasp things. Aston’s loneliness is due to all these hostile circumstances imposed on him : “*But , I don’t talk to people now . I steer clear of places like that café . I never go into them now . I don’t talk to anyone like that* ” ( Ibid , 57 ) .

As a matter of fact , Davies is the first person who has stimulated Aston’s positive interest since his horrible experience at the mental hospital . Simply , Aston likes Davies , despite the latter apparent dirtiness , and his companion . Davies , in turn , could hardly believe his good luck to be offered a refuge where the menace of the outside world is at bay . A further act of generosity is shown by Aston to offer him the job of a caretaker: “*You could ... look after the place , if you liked ...you know , the stairs and the landing ... keep an eye on it* ” ( Ibid , 42 ) .

In bringing Davies home and offering him a job , Aston is doing more than showing charity towards his fellow-human . On a large scale ,

this could be taken as an expression of his yearning for a genuine companionship , for a person who would perhaps look after him ( Esslin , 1970 : 113 ) .Thus , by taking care of Davies , Aston has shown a similar interest to be cared for .

But , one is soon aware that Davies is rather irritating . He is the one who used to “*groan*” ( Act 1, 22 ) and make noises at night that Aston is unable to sleep . Besides , his ill-nature and racial hatred soon manifest themselves . Obviously , Davies is filled with malice at the coloured people : “ *Blacks , Greeks , the lots of them* ” ( Ibid , 8 ) . Thus , he is likely to attribute the blame to “ *them blacks next door* ” ( Ibid , 23 ) for things he has been already accused of . His disgust at the coloured people is not only a statement of racial hatred . By blaming the black to be inferior , Davies is seen trying to divert attention lest it should be paid to his apparent inferiority, and an unpleasant outlook . ( Brown,1968; 152) . Davies , on the other hand , is reluctant to accept Aston’s offer to be a caretaker . His lazy nature is soon at work that he is unable to subdue . He is further beset by some irrational fears of “ *them blacks , next door* ” ( Act 1, 23 ) and other people who would perhaps come to check up on his real name and identity : “ *they’d find out [that his real name is different] they’d have me in the neck* ” ( Ibid , 20 ) , once there is a bill to call a caretaker .

Whereas Davies could not subdue his lazy nature , Aston is trying , in his simple , perhaps , naïve way , to get a foothold in the world . On one level , this manifests itself in Aston’s constant efforts to bring a sense of order into his clumsy room by making it “habitable”( Esslin , 1970 : 115) . Actually , Aston’s room is in disorder , being filled with junks , some rubbish things and broken electric fittings .It seems that these materials have been collected over the years , for one reason or another , but presently they cease to be of use . This displays , in turn , the absurdist notion that man lives in a chaos . Every thing around is meaningless and definitely with out purpose . If Aston lives in a chaos , then his attempt to structure things round him recurs man’s everlasting struggle to bring a sense of harmony and order in to a world which has gone mad and chaotic . One could also see that Aston’s clumsy room serves to be a reflection of his own confused

mentality (Ibid) . Aston's efforts to structure his room then parallel his similar attempts to overcome his perplexed mind by trying some manual works . clearly , through these attempts , Aston reveals an inner wish to regain harmony and acceptance , to be reconciled with the world which has deprived him of energy and wits :

***“ So I decided to have a go at decorating it [ the house ] , so I came into this room and I started to collect wood for my shed ”*** ( Act 2 , 40 ) .

The idea of building a shed , in this concern , is extremely important since it is strongly linked with Aston's dream of visualizing a rather purposeful life . It is worth mentioning here that Aston likes manual works . Repeatedly , he is seen meddling with the plug , trying to mend the leak in the roof but is hindered by his confused mentality . Similarly , Aston is given the task of converting the house into flats , but nothing tangible could be realized .. Though Aston does not lay it quite open , he could be in need of Davies to give him a hand in building his shed . Indeed , if Davies had been able to give Aston a hand ,both could have, no doubt , succeeded in realizing a genuine companionship they are in urgent need of . But , Davies is as shifty and undependable that his promise to help Aston is evidently unreliable .

Unluckily , Davies is given another chance to overcome his loneliness but he could not make use of it. Out of a yearning for a sympathetic companionship , Aston reveals to Davies the story he had at the mental hospital . Even though Aston keeps on complaining of Davies' unpleasant noises at night , he relates to him the horror he experienced at the hands of the psychiatrists . One could see that there is a hidden plea , on Aston's part , to strike sympathy and understanding . Indeed , if Davies had been able to react with sympathy , both could have overcome their loneliness . Both ,would be able , too , to strike a proper companionship . But , Davies' inability to show sympathy , to react with generosity is apparent . Besides , he is subject to his human weakness that he could not transcend feeling “ the superiority of the sane over the lunatic ”. ( Esslin , 1970 : 107 ) . In this concern , Pinter makes use of lighting to indicate the characters' failure of communication and their subsequent

loneliness . It is true that during Aston's monologue, Davies and other objects in the room could be hardly recognized in the shadow (Act 2 , 54) . In other words , Davies who is dimly seen in the shadow does not receive much of the light . This could be seen as an indication of the passive role he has that no matter how hard Aston tries to communicate his panic , Davies is apparently unmoved (Ibid) . Instead of lending a sympathetic listening , thus , all Davies could see is that “ *Aston was talking to himself* ” ( Act 3, 59 ) . In turn , the light is focused on Aston by the end of the monologue is suggestive of the idea that he is once more alone in his predicament that Davies is as detached and selfish .

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Davies , too , is in no position to give a proper judgement of others . For instance , his fears of Aston smiling at him are illogical . Much to his misunderstanding , Davies could not realize Aston's gesture of tenderness , probably of friendship. Ironically , he trusts Mick , the younger brother , as a “ *straight forward* ” ( ibid , 61 ) man whereas he is the one whom he must deadly fear . Davies is , then , seen pleading with Mick to be given a clock : “ *I need a clock to tell the time ! How can I tell the time without a clock ? ... If you can't tell what time ... you don't know where you are* ” ( ibid , 62 ) . One could see that Davies is doing more than testing Mick's hospitality . Indeed , there is an implied expression to communicate that he is lonely and desperate ( Styan , 1968:246 ) . Davies' request , also , serves to be a revelation of his inner wish to make a rather purposeful life by being fixed up in time and place. (Ibid)

Soon ,we come to an awareness that Mick is not the one to be trusted .It is clear that the brothers are different in temperament , equally strange in behaviours . whereas Aston is gentle , Mick is violent . The latter words are at once an expression of threat mingled with humour . Another contrast could be realized , too , in relation to the two brothers . Indeed , whereas Aston is less energetic to do manual works , Mick is described to be a tradesman , fully acquainted with the various requirements of modern life . However , Mick's situation , as a prototype of the civilized man , implies an irony . Behind the mask of civilized man Mick hides a sadistic nature which

finds an outlet in tormenting the old tramp to reduce him to speechless horror ( Cowell , 1967 : 134 ) . Mick is , thus , seen teasing Davies , in the dark , with a vacuum cleaner that the latter is on his guard , trying to protect himself with a knife . Apparently , the latter is unfamiliar with modern machines such as the vacuum cleaner. If Mick is sadistic , then Davies' violent reaction recurs man's primitive fears of the unknown and his subsequent cruelty to defend himself lest he would be attacked .

On the other hand , Mick is tricky scheming to lure the old tramp into a seeming security by offering him the job of a caretaker .His complaint of Aston's idle nature is also meant to trap Davies in away that reveals his true intentions . The latter , in turn , is aware of Mick's authority as the real possessor of the house . His selfishness then overcomes Aston's generosity .Davies could not help talking ill of Aston regardless of the fact that he is the one who has offered him the best he could . Davies is , thus , only a “ personification of human weakness ” ( Esslin , 1968 : 279 ) that he could not avoid the temptation to be sided with one brother against the other .

The problem with Davies is that he is no longer satisfied with the refuge Aston has offered , but he seeks dominance . His vicious nature is soon at work that he is ready to attack Aston with his knife , to deny his noise-making at night . By doing so , Davies seems to be “ *a wild animal .... a barbarian* ” ( Act 2 , 35) , who is ready to stab any attacker only to show that he has been put in charge by Mick . It is true that Davies does not deserve the charity shown by Aston . Indeed, he is not only selfish but also scheming to make advantages of Aston's story at the mental hospital in a way that taunts him : “ *They[ psychiatrists ] can put the pincers on your head again ... they'd have you fixed* ” (Act 3 , 66).It is worth mentioning here that Davies has committed grave errors which caused his final tragedy . By suggesting that Aston is mad whose best place is the mental hospital , Davies is revealed as a real menacing figure who threatens to dismiss Aston from his own house hold , to deprive him of his own place in the world ( Esslin , 1970 : 115 ). Besides , Davies has gone further to denounce Aston's shed as “ *stinking* ” (Act 3, 68) and that it will never see the light . As it has been already suggested , Aston's future

shed is strongly linked with his own dream of achieving something useful with the hands . Indeed , if Davies' assumed journey to Sidcup is the essence of an otherwise empty existence , then Aston's shed is no less important to make his life rather purposeful . Obviously , an insult to Aston's shed means a deathblow to his whole existence . Thus , Aston's final break with Davies could be justified in the light of the indignation the latter shows at his shed .

Mick's anger , is also aroused to remind the old tramp that time has come when he must be on the move .Instantly Mick storms at Davies' reference to Aston's unbalanced mentality : “ ***Did you call my brother nutty ? My brother*** ” ( Ibid ) . It could be suggested , in this concern , that Mick is moved by the pricks of a sinful conscience for the role he might have in subjecting Aston to the mental hospital ( Esslin , 1968 : 263 ) . He is no less moved , by some instinctive feelings , to defend his brother when necessity demands . In addition , Mick is revealed as the real threat for Davies' temporary refuge that he is likely to deny him responsibility treating him as an outsider :

*What a strange man you are , aren't you ? ...  
Ever since you come into this house , there's  
been  
nothing but troubles ... Most of what you say is lies .  
you're violent , ... erratic , you're just completely  
unpredictable .*

( Act 3 , 73 )

Mick's speech , in this sense , implies an irony . Indeed , his words do not only serve as a criticism of Davies' quarrelsome existence and abject unreliability but also a revelation of Mick's own violent nature and equally erratic, unpredictable schemes . ( Taylor , 1963 : 299 ) .

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Davies , then, is an outsider , not only in relation to society which has denied his existence and human rights , but also in relation to the two brothers . Even though the brothers are rarely seen talking , addressing each other only when it is necessary , they share understanding and sympathy . They are likely seen “ ***smiling faintly at each other*** ” (Act 3, 75 ) and thus are united against Davies .Mick's

immediate rejection of Davies , however, is opened to different interpretations . On one level , Mick could be moved by an instinctive jealousy to see his brother showing a positive interest in an outsider ( Taylor , 1963 : 301). He could be determined not to let an outsider be allowed into their house ( Ibid ) . Thus , the first thing Mick puts in mind is to get rid of Davies . Mick’s appearance, on the other hand , is perhaps meant to repay Davies for what he has already paid Aston ,for his lack of generosity and unreliability . Mick’s act of destroying the Buddha (Act 3 , 74 ) serves the discussion here . It emerges that Aston has conceived a strange delight in having the Buddha as a piece of ornament : “ *picked it up in a shop ... looked quite nice to me . Don’t know why ... yes , I was pleased when I got hold of this one . It’s very well-made*  ” (Ibid ,71) .Aston , too ,has shown a similar interest to have Davies home in the hope that both would be able to strike a sympathetic companionship . On the one hand , Mick might show his rage against things Aston has already shown an interest in having . Perhaps , they look quite unnecessary for Mick whose mind is caught in luxurious dreams of flat-building and modern decoration . The Buddha , on the other hand , could be a representative of Davies and of Aston’s naïve interest to have them home ( Esslin , 1970 : 116) . By unspoken rejection , Mick smashes the Buddha to communicate that Davies should be on the move . Mick’s act could be , further , a revelation of his own violent nature which though hiding itself behind the mask of a civilized man .

Originally ,Pinter thinks of a bloody action , a violent end the way the tramp is stabbed by the two brothers .Soon , he dismisses the idea that violence is quite inadequate . Davies is sentenced by rejection and its associated loneliness which is far more killing . Therefore , the only alternative given is that he “ must go in such a way as to produce a sense of complete separation and finality ” ( Brown , 1968 : 153 ) .

Davies is seen desperately pleading for the room which was once his secure haven . Evidently , he is in no position to leave for “*where else he should go*” (Act 3 ,77) . His unwillingness to be on the move is put in a sharp contrast with the rather refrain – like mentioning of his desire to go to Sidcup . Once more , his inadequacy manifests itself

for , best to his knowledge , the moment he starts his journey , the whole illusion about himself will crumble to dust . In this sense , Davies is a reminder of Pinter's characters and their recurrent plea to defend their rooms lest they should face the hostile world outside . Basically , they are scared of what is going on outside their rooms since outside is:“ a world bearing upon them , which is frightening ... and outside is a world which is most inexplicable and frightening , curious and alarming ” ( Esslin , 1968 : 266 ) . Typical , of this fear is the expression of Davies' desperate words , almost choked in his throat , with which the play is enclosed : “ *Listen [ Aston ] ... if I ... got down ... if I was to ... get my papers ... would you ... would you let ... if I got down ... and got my ...* ” (Act 3,78)

Though Aston is apparently unmoved by Davies' words , remains still his back to Davies at the window his situation is no less tragic . Aston has done what he thinks adequate to strike a companionship to overcome his loneliness ,but his humility receives the greatest hurt .His generosity is sentenced by Davies' selfishness and thus his deadly silence is justified .

#### **4.Conclusion**

To conclude , Pinter undertakes to show the inevitability of human loneliness . No matter how man tries , how shaky and desperate he tends to avoid , the more certain it is assured . A careful account of the theme in question , however , reveals that loneliness could be either the outcome of man's own short comings or rather imposed by some hostile circumstances conspiring against him .

The first explanation could be true in relation to Davies' situation . Incidentally , Davies has been rescued by Aston when he was terribly lonely . He could hardly believe his good luck to have things he has , for long , dreamed of . But , he could value these things once they are missing . Indeed , Davies has been given more than one chance to be reconciled with the world , to overcome his loneliness , but he couldn't make use of them . His tragedy is that he could not subdue man's inherent evil to react with humility and generosity . Even though , he has been paid with generosity and sympathy by Aston , he could not overcome his human weakness to play off one brother against the other .

Aston , on the other hand , is doomed by loneliness for different reasons . The fault could be attributed to society which has sentenced his sensitivity and energy . Indeed , for all his clear insights and artistic inclinations , Aston has been reduced to conformity . He has been betrayed by his cruel mother , probably by his scheming brother , to practise science on his brain . To overcome his lonely condition , Aston has done all he thinks adequate to strike a genuine companionship ,but is obviously betrayed by Davies . Aston's loneliness , in this concern , is not an act of will . Rather , it is imposed by hostile circumstances beyond his control . The only consolation Aston has , in his loneliness , is his brother . He could be compensated by having a brother , whom , though is repeatedly suspected , yet instantly moved to defend Aston .

After all , it seems ironical to think how desperate Aston and Davies have been in their yearning for a sympathetic companionship and how tragic their ends not to realize their target .

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## Evaluate the Efficiency of Plate Load Test of ASTM Standard Procedure of Stone Piles

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### Abstract

The last studies has been studied a general behavior of stone piles and found that behavior is be very complicated if compare with that of other types of piles. Since the field studies are regarded to be the better way to describe such behavior, by using the ASTM standard procedure.

The present paper discusses the efficiency of ASTM standard procedure in case of full-scale tests on stone piles. The field study here included installing observation points on soil surface neighboring pile face.

The results of study establish that ,the procedure is need to a perform a some moderation in dimensions of loading system.

تقييم كفاءة المواصفة القياسية الـ (ASTM) على فحوص كاملة المقياس على ركائز

حجرية

### الخلاصة

من الدراسات السابقة التي درست التصرف العام للركائز الحجرية stone piles والتي وجدته معقد جدا" إذا ما قورن بالأنواع الأخرى من الركائز. ولما كانت الدراسات الموقعية هي الأف. فل من بين الطرق لوصف ذلك التصرف فقد استخدم فحص تحميل الصفيحة plate load test وذلك بتطبيق خطوات فحص التحميل القياسي (ASTM) .

وكذلك مناقشة المواصفات القياسية ASTM في حالة فحوص التحميل الموقعية للركائز الحجرية ، من خلال زرع عدد من نقاط الملاحظة الموقعية observation points على سطح التربة المجاورة لوجه الركيزة . نتائج الدراسة المقدمة أثبتت أنه المواصفة القياسية للتحميل ( ASTM ) تحتاج الى قليل من التعديل خصوصا" في الجزء المتعلق بأبعاد نظام التحميل.

## 1-Introduction

A semi-direct method to estimate the bearing capacity of a soil in the field is to apply a load to a model footing and measure the amount of load necessary to induce a given amount of settlement A plate load testing is available (see Bowels,1988) .

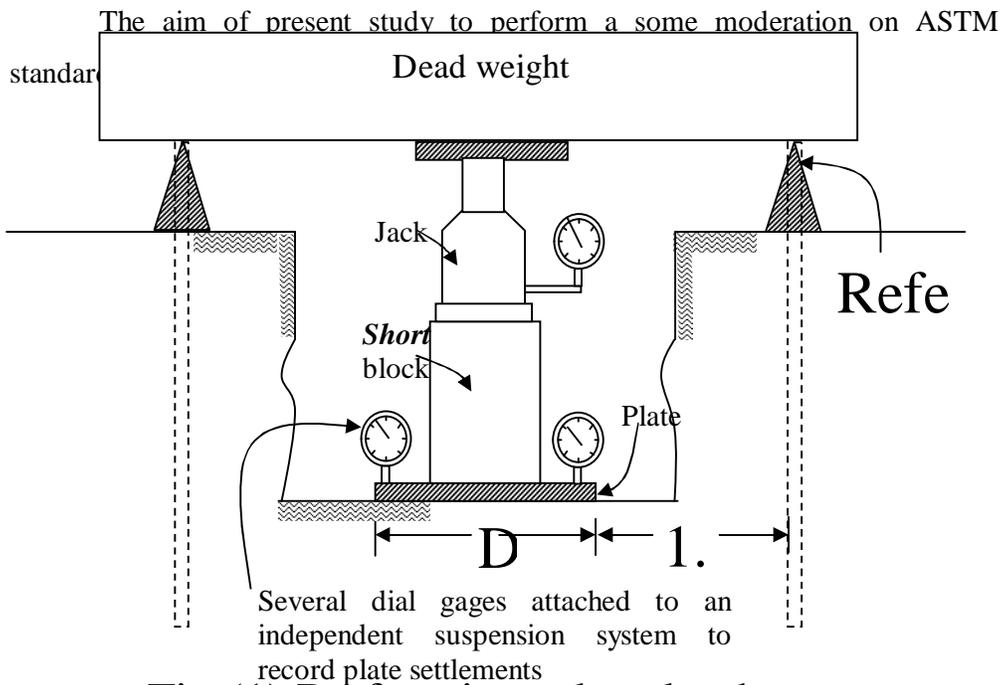
The method of performing this test is outlined in some details as ASTM standard procedure as shown in Fig.1.

In case of piles , the test should continue until a total settlement of 25 mm is obtained, or the capacity of the testing apparatus is reached.

Since both the rate and amount of settlement of stone piles are the greatest if compare with other type of piles as it come in all last studies, it expected that the plate load test is not proper in such type of piles during loading and unloading process. That may be back to the settlement of soil neighboring pile body which effected by settlement of pile body that extended in most times to tenths of centimeters during loading test.

However, most of last studies were depended ASTM standard procedure where it was employed in their field tests ,see (Hughes et al,1975; Goughnour and Bayuk,1979;Engelhardt and Golding,1975; Dayte and Nagaraju,1981; Ahmed,1998; Al-Recabi,1999;and Al-obaidy,2000).

In this paper, six observation points were installed during loading and unloading process. Installing these points to study the behavior of soil neighboring pile body in area between pile face and reference beam (loading system support).



**Fig.(1) Performing plate-load testing as ASTM standard**

## 2-Site Condition and Soil Properties

The test program was carried out at the old Al-Muthanna airport area in Baghdad governorate.

In position of testing area a bore hole was made, at the laboratory of NNCL[national center for construction laboratories ] , the porogram was set to test the obtained disturbed and undisturbed sample in order to revealsoil properties.

Table (1) A Complete Summary of Laboratory Test Results

Samples		U.C. Test KN/m <sup>2</sup>	Drained Shear		Consolidation Tests				Chemical Tests		
No.	Type		C (kN/m <sup>2</sup> )	f <sup>0</sup>	E <sub>0</sub>	C <sub>c</sub>	C <sub>r</sub>	Pc (kN/ m <sup>2</sup> )	So <sub>3</sub> %	PH	Cl %
1	D										
2	SS								0.35	7.73	.06
3	D										
4	U		27	30	0.75	0.12	$\frac{0.02}{3}$	155	.13		
5	SS	19									
6	SS										
7	SS								.12	7.79	.05
8	SS										
9	D										
10	SS										
11	D										
12	SS										
13	D										
14	SS		0	32					0.1		
15	D										
16	SS								0.23	7.73	

## 3-Stone Pile Properties

A graduated Cino stone added by a boulder represent a main backfilling of a pile that decided to be in test .

Dimensions of this pile body are (6\*1.5)m [see Fig.2]

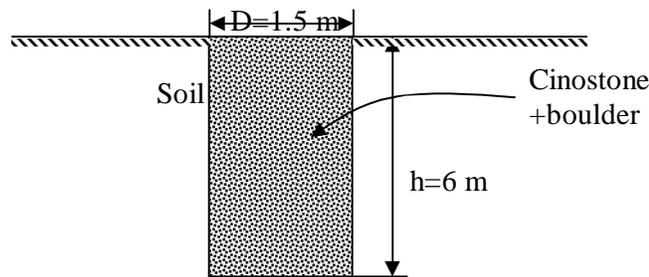


Fig.(2) Dimensions of stone pile body

#### **4- Equipment**

The equipment are included the following:

- 1- All equipment of dead load "Kentledge" system [loads,supports(references beam),hydraulic jucks,steel plates ,dial gauges,etc...] .
- 2- Six dial gauges of 0.01 mm accuracy.
- 3- Six steel bars .
- 4- Six circular block of concrete.

#### **5-Installation Technique**

The stone pile was constructed and the load was placed centrally and vertically by means of dead load "Kentledge" system.

Six observation points were fixed in two orthogonal directions, each point consists of the following:

- A dial gauge for monitoring the readings of settlement,
- Steel bar for establish the gauge,
- Concrete block fixed on soil surface and conducted with the steel bar, Fig.3 shows the main sketch of one observation point.

In addition, that six points arranged at distances equal to (0.5,1,and1.75m) respectively far from pile face, see figures 4 &5 where the first figure represents a top view of points from pile perimeter and the second shows the cross section of loading system gives positions of points.

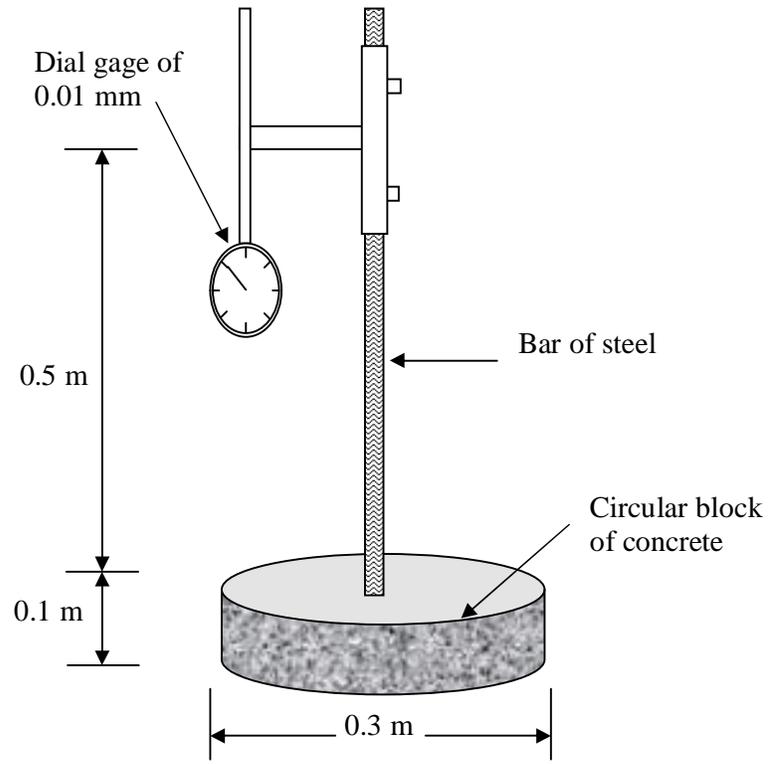


Fig.(3) observation point

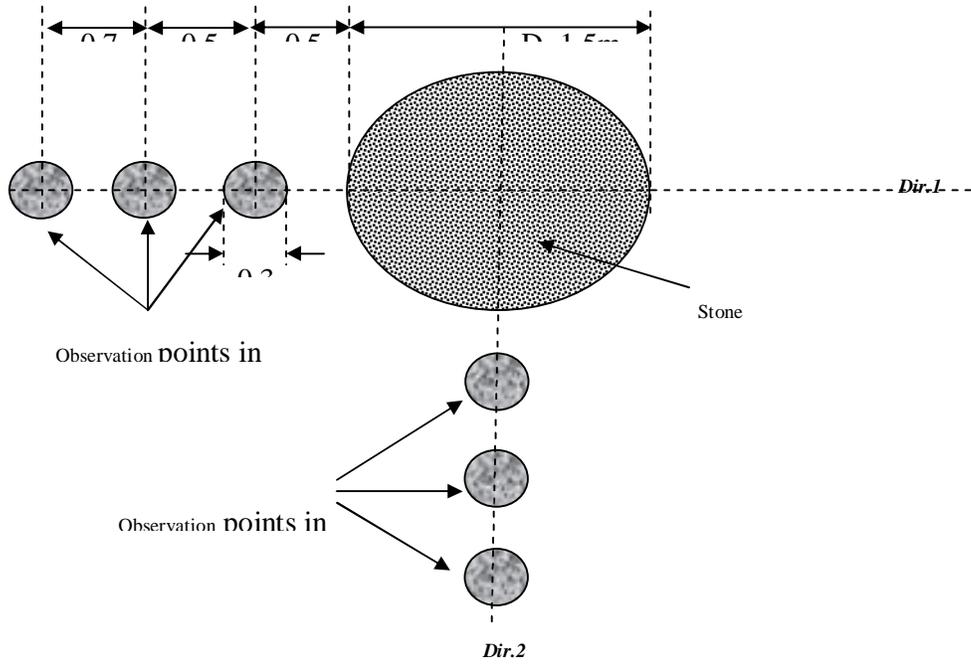


Fig.(4) Top view to position of observation points from pile body

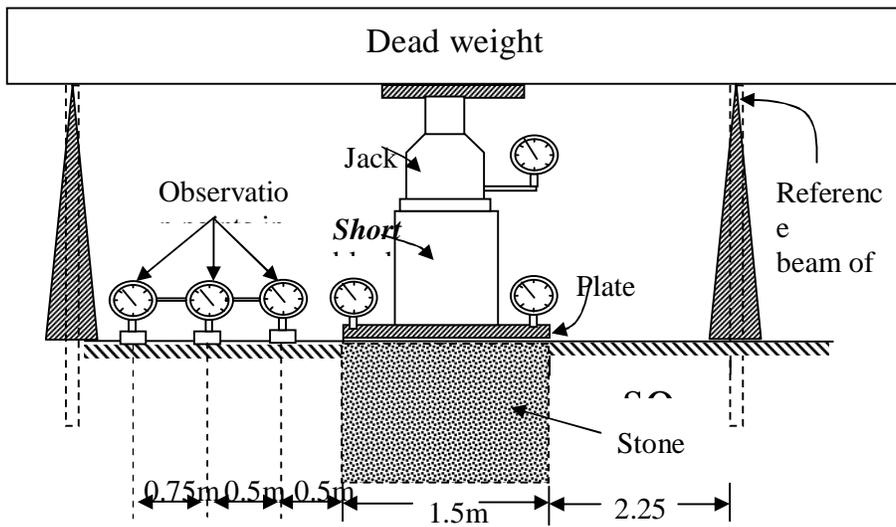


Fig.(5) Cross section in loading system shows positions of observation points

### **6-Testing Program**

To study the influence area around pile body, it has been chosen the observation points in a distances far from pile face as seen in last section, then tend to monitor readings of settlement under loading and unloading process.

Points 1, 2, and 3 placed in direction (1) which is perpendicular with reference beam of 6 m long (see plate-1-) whereas the other points 4, 5, and 6 placed in direction (2) which is perpendicular with reference beam of 18 m long (see plate -2-)

The specification ASTM No. D1143-87 was employed. During testing process, the load was placed centrally and vertically on a circular plate above stone pile body. The axial load was applied on the piles by means of hydraulic jacks and two type of reference beams 6 and 18 m long were used as above illustration.

The piles were loaded to 200% of design load with (8) increments, each one is equal to 25% of design load maintained for one hour, the final load increment maintained more than 12 hr... Then the unloading process was performed by four equal decrements, each one is 50% of design load.

The readings of dial gauges of observation points were taken.



Plate (1) Positions of Points of dir.1 (1,2,and3) orthogonal to reference beam of 6 m long



Plate (2) Positions of Points of dir.2 (4,5,and6) orthogonal to reference beam of 18m long

**7-Presentation and discussion the results**

Fig.(6) shows the load-settlement relationships and Fig.(7) shows the corresponding time –settlement curves for chosen observation points during the first cycle of loading and unloading of stone pile.

From previous figure and after application the load increment on pile body, it can be observed that the settlement of a certain point in one direction gradually increases with time interval in amount proportional with a distance far away pile face.

If we take direction-1, we found that the nearest point (1) suffer from high settlement if it compare with two other points in same direction. In such away point (2) settles with amount greater than that of point (3).

In the same manner, it can be found all three points in direction-2- but with a little amount of settlement.

If we traced the behavior of these points in the two direction during unloading process, we almost found that it continued in settle, that may be go back to voids which are formed in pile body during it unloading such that soil particles push toward pile body to fill the forming spaces.

In addition to re –arrangement for pile material causes a sudden movement for soil neighboring pile body.

Therefore, the settlement of observation points in area between pile body and reference beam increases during loading and unloading. so the chosen distance 2.25 m between pile body and a reference beam of 6 m long according ASTM specification is consider to be so near and improper ,so it must to adopt anew specification is different from available specification take in consideration the high sum and rate of settlement for stone pile or at least select anew dimension for the distance between pile face and reference beam, see plate-3- which describe the soil surrounding pile body effected by loading system in moment of finishing testing program .

Here, it is benefit to suggest the dimension between pile body and reference beam as 2.5D instead of 1.5D dependent on the laboratory study of Al- Mosawe et al in 1985.

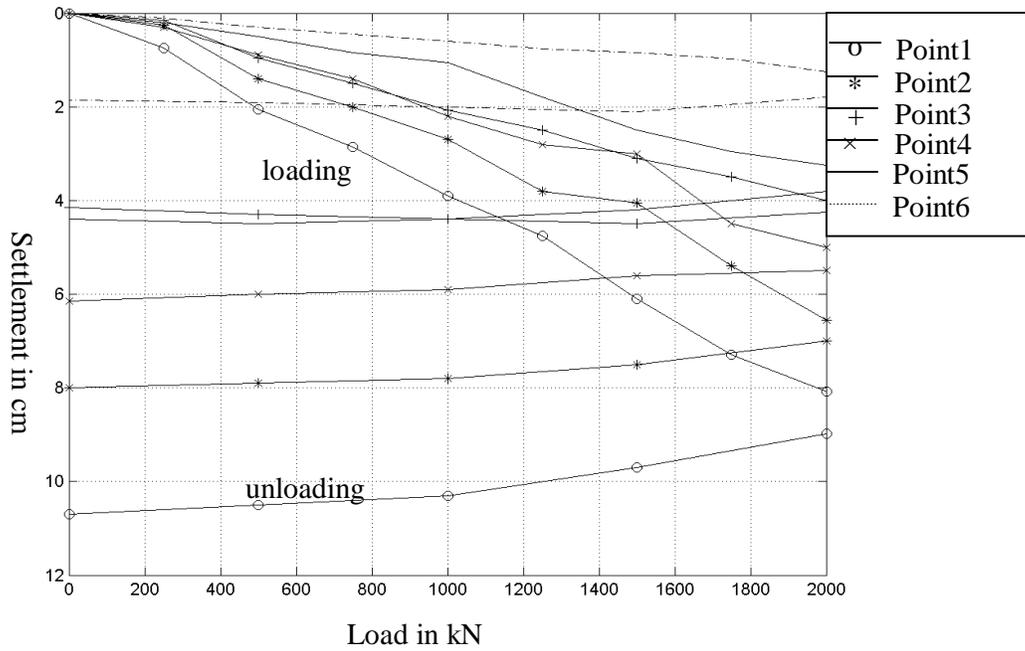
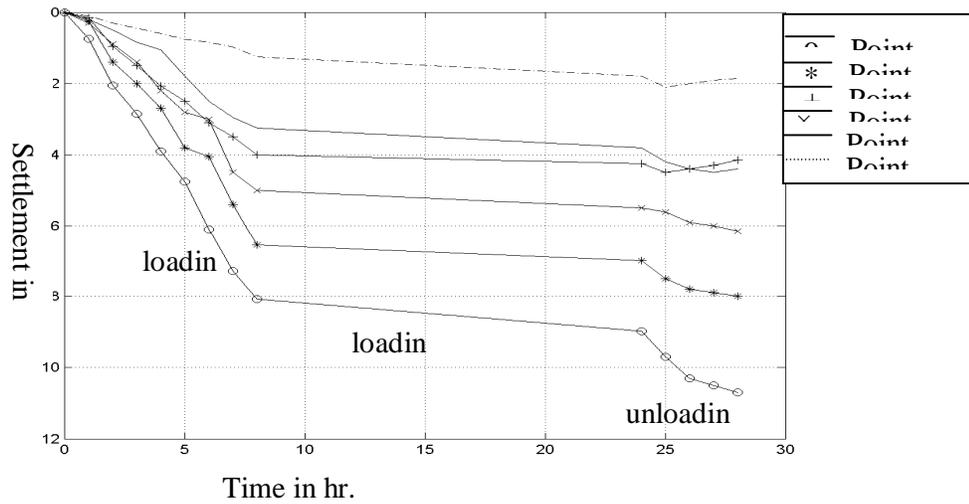


Fig.(6) load- settlement curves of



Fig(7). Time-settlement curves of observation points during loading and unloading

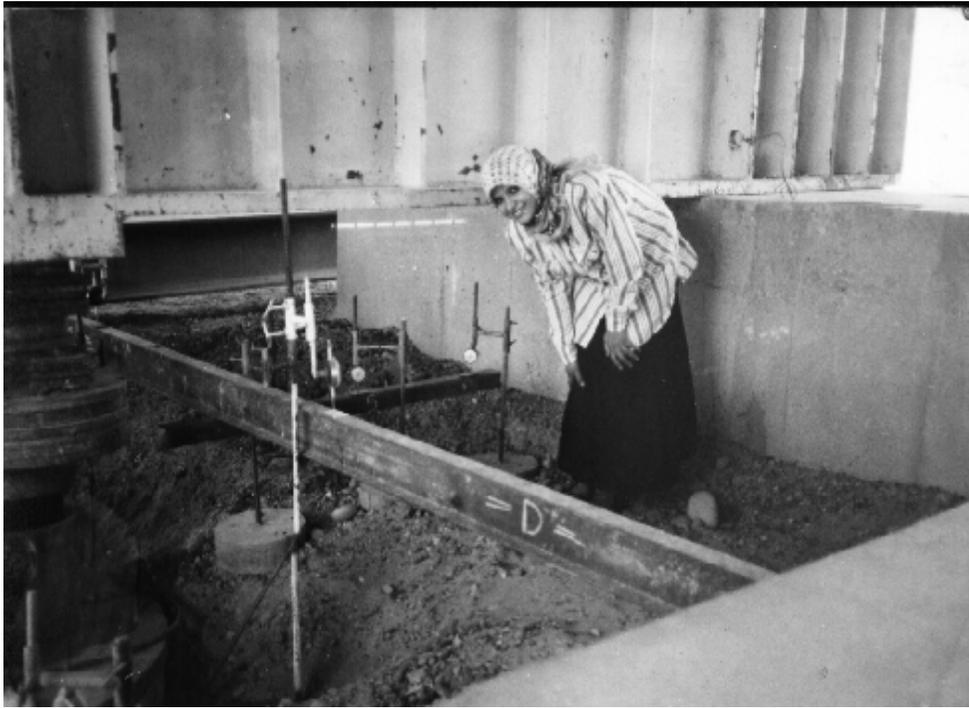


Plate-3-. Soil neighboring pile body effected by loading system after finishing the test

### **Recommendations**

- 1- Study the efficiency of standard specification in case of group stone piles.
- 2- Perform axial loading test on stone pile according ASTM specification with make a moderation by take the distance between pile body and reference beam equal to  $2.5D$ .
- 3- Install a large number of observation points in different directions and it can monitor the dissipation of pore water pressure of surrounding soil to pile body.

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Table (1) A Complete Summary of Laboratory Test Results

Samples		Depth in (m)		Index Properties %			% Pass. By wt. From Sieve No.				S. p. T.	Symb of Uni. Class	Description of Soil	Unit Weight (g/cm <sup>2</sup> )	
No.	Type	From	To	M.C.	L.I.	P.I.	40 Clay	100 Silt	400 sand	200 Gravel	"N" Value			Wet	Dry
1	D	0	1		53	31	37	48	4	11		CH	Br.fat clay with gravel		
2	SS	1	1.5				40	53	6	1	16	CH	Stiff br.fat clay		
3	D	1.5	3		49	30						CL	Brown lean clay		
4	U	3	3.5	27	38	16	17	73	10	0		CL	Brown lean clay	1.86	1.46
5	SS	3.5	4				12	66	22	0	12	CL	Stiff grey lean clay with sand		
6	SS	5.5	6		32	12	2	62	36	0	14	CL	Stiff grey sandy lean clay		
7	SS	7.5	8								16	SM	Medium grey silty sand		
8	SS	9.5	10				-	18	82	0	31	SM	Do (dense)		
9	D	10.5	11.5									SM	Do		
10	SS	11.5	12				-7	-	92	1	33	SP-SM	Dense grey poorly graded sand with silt		
11	D	13	14		61	32	60	34	6	0		CH	Brown fat clay		
12	SS	14	14.5		53	31	65	28	7	0	60	CH	Do(hard)		
13	D	15.5	16.5		50	25	12	32	56	0		CH	Grey sandy fat clay		
14	SS	16.5	17								32	SM	Dense grey silty sand		

15	D	18	19 5			- 1 2	-	8 6	2		SM	Do		
1 6	S S	19. 5	2 0			- 2 7	-	7 3	0		SM	Do (v.dense)		
1 7	Water Sample		<b>Depth of Ground Water =0.75m below the N.G.S.</b>											

## Fuzzy controller Design of servo system

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### Abstract

In the past few years, fuzzy-rule-based modeling has become an active research field because of its good merits in solving complex nonlinear system identification and control problems.

A servo system (SS) is a class of a nonlinear position system that needs to be positioned accurately and fastly on a commanded position. The strategy followed in this paper in designing digital controller for such system is as follows:

- 1. Building a neuro-model that represents the open loop servo system. This is accomplished by sufficiently collecting input-output data and used it off-line to build the neural network that will represent the plant for the second design stage.*
- 2. Design fuzzy controller through simulation to reach the required closed –loop behavior.*

*The design technique is based on the adjustment of the scale factors, rule base and membership functions of the controller was accomplished by fine tuning and heuristic corrections linked to the knowledge of the process to be controlled. For the specified plant, there are certain parameters, which achieved a well-controlled response.*

### الملخص:

أصبحت النمذجة المعتمدة على استخدام قواعد البيانات الضبابية ( *fuzzy rule base* ) من المجالات الفعالة وذلك بسبب مميزاتها الجيدة في حل معضلات السيطرة والتعرف على معالم المنظومة غير خطية.

أن منظومة الموازنة هي نوع من أنواع المنظومات الغير خطية والتي تتطلب السيطرة على خرج المنظومة الموقع المطلوب بدقة وسرعة عالية. إن الاستراتيجية المعتمدة في هذا البحث لتصميم المسيطر الرقمي الضبابي (*digital fuzzy logic controller*) للسيطرة على منظومة الموازن تعتمد على:

أولاً: "بناء نموذج عصيبي (*neuro-model*) والذي يمثل المنظومة الموازنة المفتوحة (*open-loop s.s*) ويتطلب ذلك معرفة بيانات الإدخال والإخراج لتلك المنظومة، حيث تستخدم تلك البيانات لبناء شبكة عصبية منفصلة (*off-line*) لتمثيل المنظومة (*plant*) لمرحلة التصميم اللاحقة.

ثانياً: "تصميم المسيطر الضبابي من خلال التمثيل باستخدام الحاسوب للحصول على الاستجابة المطلوبة للدارة المغلقة

(*closed-loop*). تعتمد تقنية التصميم على تنظيم عوامل القياس (*scale factors*) والدوال العضوية (*membership functions*) للمسيطر الذي تم بناءه باستخدام التنعيم الدقيق والتصحيحات المؤرخة (*heuristic corrections*) المرتبطة بمعرفة النظام المراد السيطرة عليه. ومن الجدير بالذكر ان لكل منظومة هناك معلمات خاصة تحقق الاستجابة المطلوبة.

### *Fuzzy logic controller*

#### *1. Introduction:*

Increasing, control systems are required to have dynamical performance and robust behaviors, yet are expected to cope with more complex, uncertain and highly nonlinear dynamic processes. Along with this increased process complexity is increased abstraction and uncertainty in the models and their mathematical representation. One significant approach in dealing with major changes and uncertainty in nonlinear dynamical processes is through intelligent modeling and control. Intelligent controllers are generally self-organizing or adaptive and are naturally able to cope with the significant changes in the plant and its environment, while satisfying the control design requirement [1]. As with any advanced control theory, a central issue is the representation and development of appropriate process models with known approximation errors. As processes increase in complexity, they become less amenable to direct mathematical modeling based on physical law, since they may be [2]:

- *Distributed, stochastic, nonlinear and time varying.*
- *Subject to large unpredictable environmental disturbances.*

· *Have variables that are difficult to measure, have unknown casual relationships or are expensive to be evaluated in real time.*

*The conventional controllers encounter difficulties when facing nonlinear, uncertain, temporal behaviour. In recent years, a great deal of attention has been paid to the application of Artificial Neural Networks (ANN) in modeling, identification, and control of dynamic processes [3]. ANNs provide an excellent mathematical tool for dealing with nonlinear problems. They have an important property, according to which nearly any continuous nonlinear relationship can be approximated with acceptable accuracy using a neural network with suitable architecture and weight parameter. There is another attractive property is the self-learning ability.*

*A neural network (NN) can extract the system feature from historical training data using the learning algorithm, requiring a little or no a prior knowledge about the process. This provides modeling of nonlinear system a great flexibility. These features allow one to design adaptive control system for complex, unknown and nonlinear dynamic process [4].*

*As opposed to many effective applications, e.g. in pattern recognition problems, approximation of the nonlinear function, the application of NN in control systems requires taking into consideration the dynamic of the processes being investigated. Another important application area, where the dynamic NN can be effectively used, is diagnostics of industrial process [3].*

*Recently, fuzzy logic controllers (FLCs) are finding increasing use in industry. The application of fuzzy reasoning to process control has opened up a new approach in this field. A controller is built from a set of fuzzy rules naturally incorporate commonsense expert knowledge, it may be easier to build and to maintain this than a conventional controller [5].*

***The advantage of fuzzy control lies in its ability to implements the action of expert operator without the need of accurate mathematical model. The main benefits of this approach can be summarized as set below: [6,7]***

*1.It is a technique from the field of artificial intelligence (AI), which can be usefully*

*employed to control a complex, nonlinear dynamic plant.*

2. Fuzzy controller are more robust than Proportional Integral Derivative (PID)

controllers because they can cover a much wider range of operating conditions

than PID can, and can operate with noise and disturbances of different natures.

3. Developing a fuzzy controller is cheaper than developing a model based or other

controller to be the same thing.

4. *Fuzzy controllers are customizable since it is easier to understand and modify their rules, which not only use a human operator's strategy but also are expressed in natural linguistic terms.*

5. *It is easy to learn how fuzzy controllers operate and how to design and apply them to a concrete application.*

*The main objective of this work is to design and implementation of fuzzy logic controller to the servo system. The work is directed towards the following points:*

1. *To identify the servo system by the neural method MRNN*

2. *Using the neuro-identified model to design the fuzzy logic controller.*

3. *Testing the performance of the proposed design on the servo system.*

2. *System identification:*

***In general, exciting the system and observing its input and output over a time interval performs an identification experiment. These signals are normally recorded using computer with mass storage. The first step is to determine an appropriate form of the model and in the second step some statically based method is used to estimate the unknown parameter of the model. Finally the model obtained is tested to see whether it is an appropriate representation of the system [8].***

*The position system under experiment for collecting the input-output data depends on the feedback principle that the comparison of the controlled variable ,whatever it may be with a desired value of that*

variable, so that an error signal or a measure of the error, can be formed. The servo is so arranged that operate in a sense to reduce the error to zero so that the output equal the demanded input. The objective of the servomechanism is to position a massive object by means of a motor and gearbox.

*The performance of RLS and MRNN for system identification will be examined, by considering the input output data collection from the plant.*

*The parallel identification scheme, which is used for identification, based on modified recurrent neural network (MRNN) is illustrated in figure (2). The network is trained using the backpropagation-training algorithm [9]. The collected data from the SS if 1volt-step input is applied to the preamplifier is shown in figure (3). The input signal  $U_p(k)$  is applied to the plant as well as the network and the error signal is then feedback to the network. The aim of the learning is to minimize the R.M.S error.*

*The learning rate was chosen by trial and error for the MRNN, typical value to be chosen is (0.01).*

*For the recursive least square (RLS), the initial value of estimation parameter chooses to be zero ( $q(0) = 0$ ), and initial covariance matrix  $P(0) = s_0 I$  with ( $s_0 = 300$ ). Figure (4) shows the responses of the RLS method and the SS, which is represented by the input output data collected. Figures (5) shows the modeling error of the RLS method, and figures (6) show the covariance matrix trace of the RLS, and figures (7), (8), (9), and (10) show the parameter estimates of the RLS ( $a_1, a_2, b_1$  and  $b_2$ ).*

*To demonstrate the capability of this neuro-identifier, the MRNN is selected with one input, six hidden and context units, and one output unit. The learning rate is chosen by trail and error and it is notice that, large learning rates cause oscillations or even instabilities to the training process as shown in figure (11). When suitably small*

learning rates are adopted so that no oscillations or instabilities occur, training R.M.S errors are extremely slow to reach an acceptable error level for good results. Increasing the number of hidden units makes the achievable R.M.S error levels smaller. However the number of hidden units cannot be too large because the permissible learning rates become even smaller and the training is even slower [10]. Also, the initial values of the weights are effective in the training process, this is due to the fact that the starting point of the learning process is determined by the initial values of the weights.

The choice of activation function is not a vital problem. Practically, in the field of using NN identification, if the system to be identified is linear, a linear activation function is used. And in the case of nonlinear system, a nonlinear activation function will be used [11]. However, many tests have been carried in order to show the effect of the type of the activation function on the identification results. For this work the sigmoid activation function was chosen for the hidden and output layer. The initial values of all trainable weights are initialized at small random values between (0.5, -0.5). Figs. (12) shows the response of MRNN model and the SS.

It is clear from Figs. (4) and (12), that the MRNN represent the system under test more accurately than the RLS.

The transfer function obtained by the RLS can be written as follows:

$$G(z) = \frac{b_1 Z^{-1} + b_2 Z^{-2}}{1 - (a_1 Z^{-1} + a_2 Z^{-2})}$$

Where  $a_1 = -1.7417, a_2 = 0.7419, b_1 = 0.051, b_2 = 0.051$  are the convergence parameters.

All the software has been written using MATLAB commands and Simulink application tool, version 6.

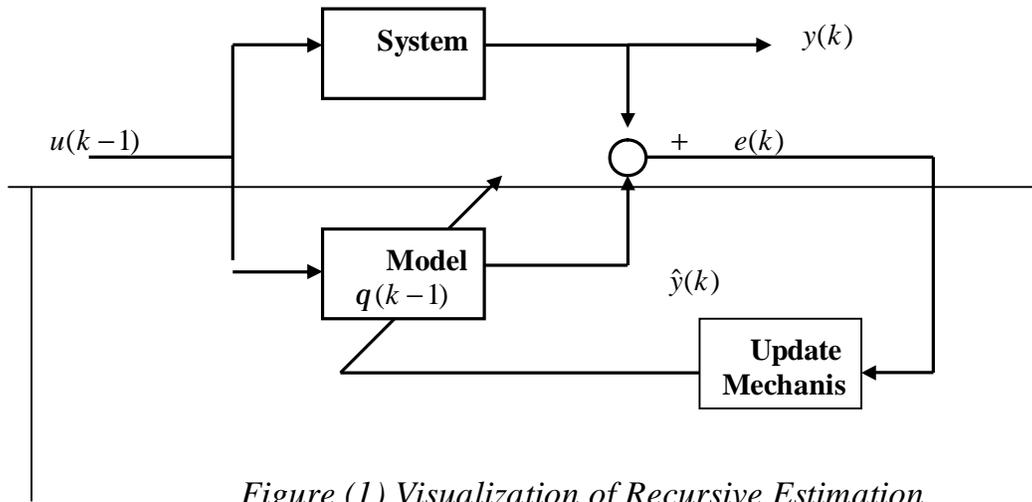


Figure (1) Visualization of Recursive Estimation

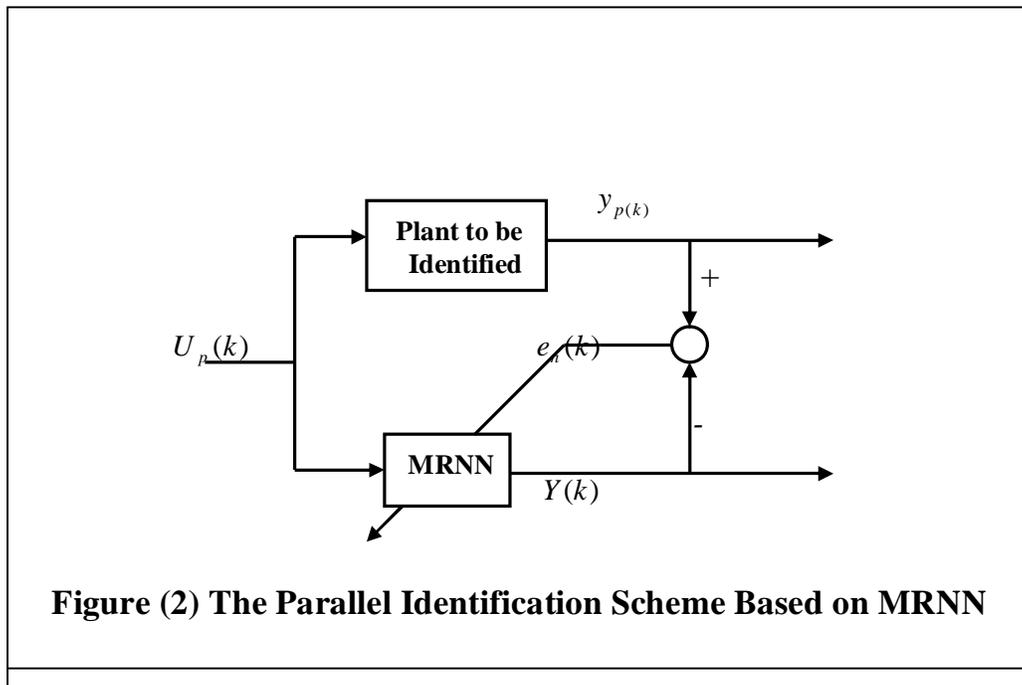


Figure (2) The Parallel Identification Scheme Based on MRNN

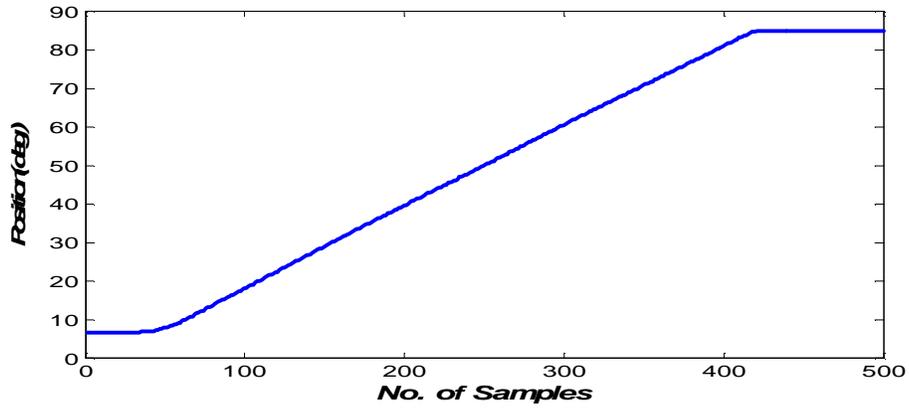


Figure (3) position of the SS excited by a 1-volt step command input

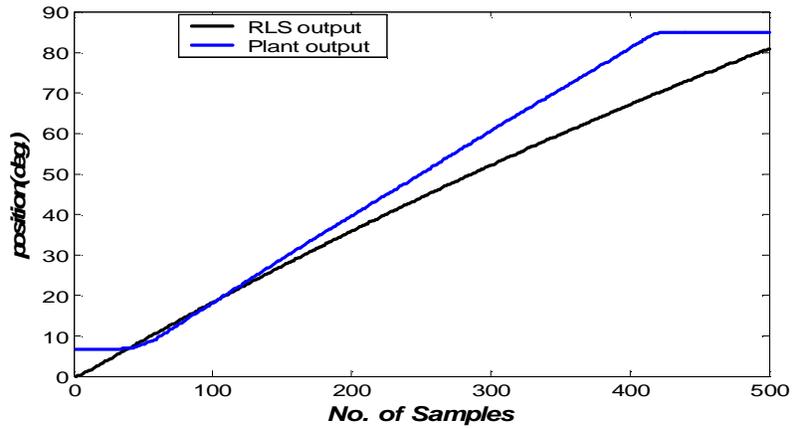


Figure (4) position of the SS excited by a 1-volt step command input and the RLS estimated position excited by the same input.

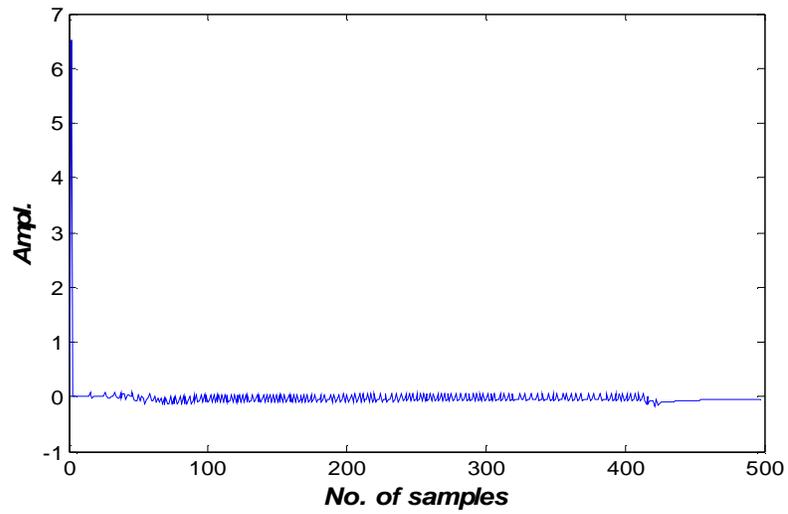
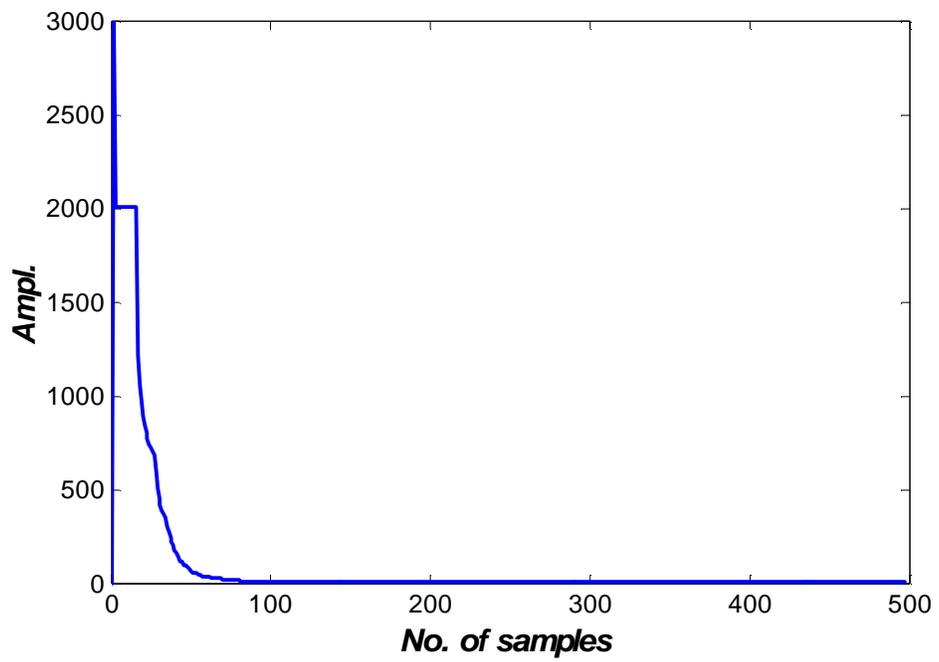
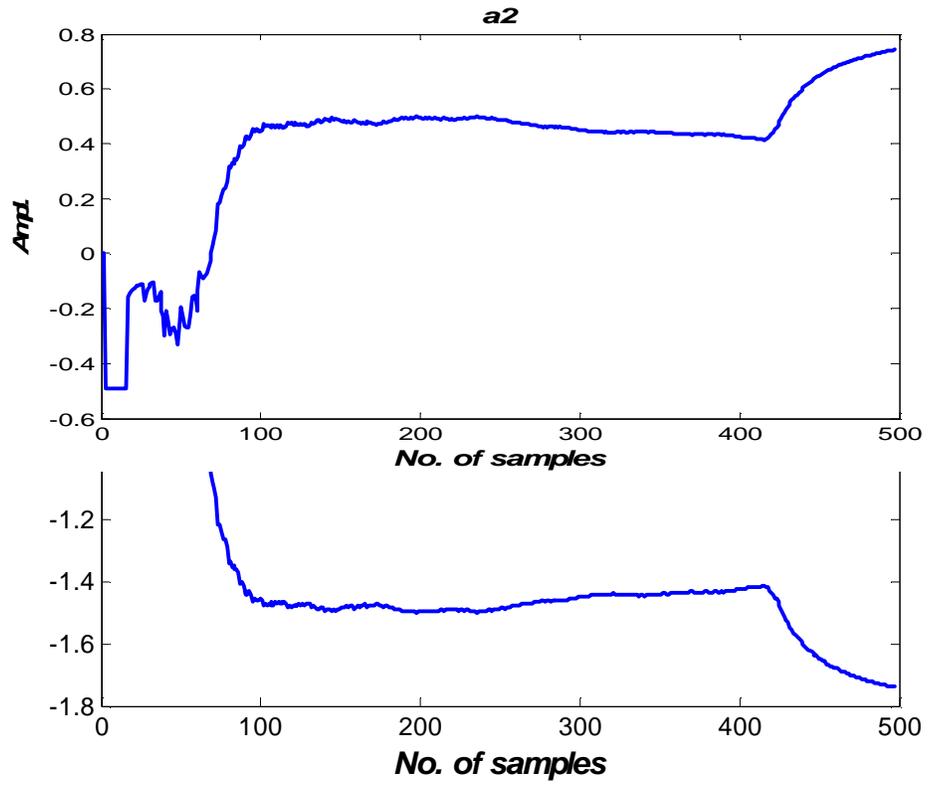


Figure (5) modeling error of the RLS

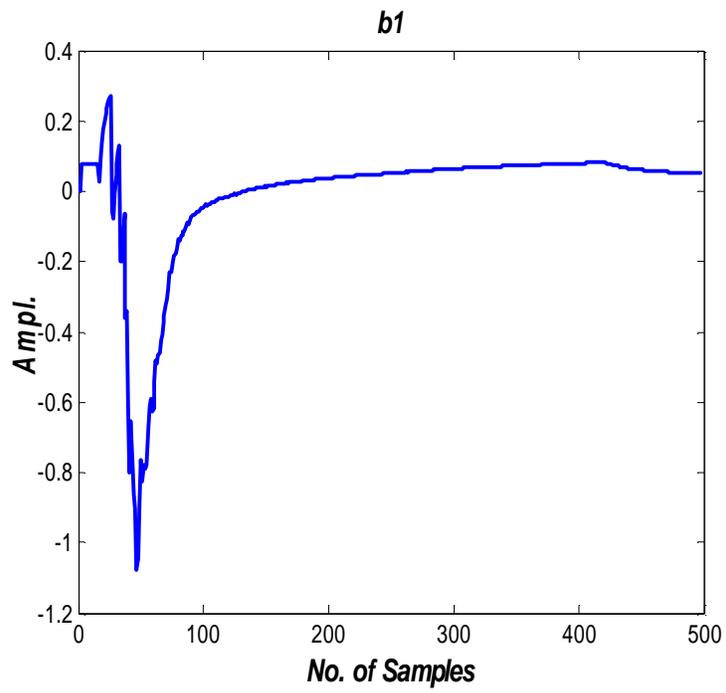




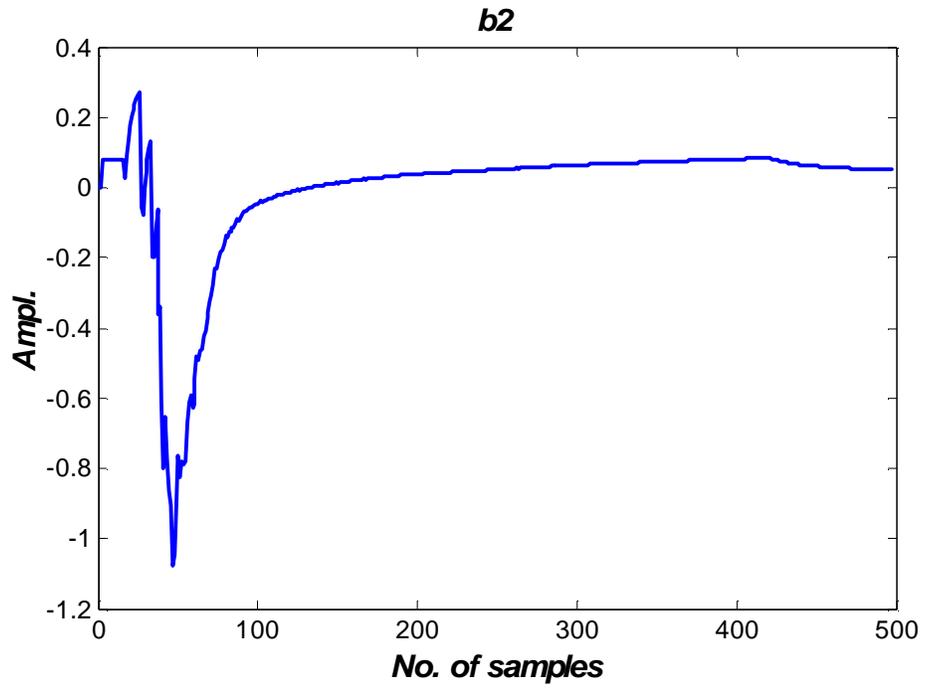
*Figure(6) trace of the RLS*

*Figure (7) parameter estimate of the RLS*

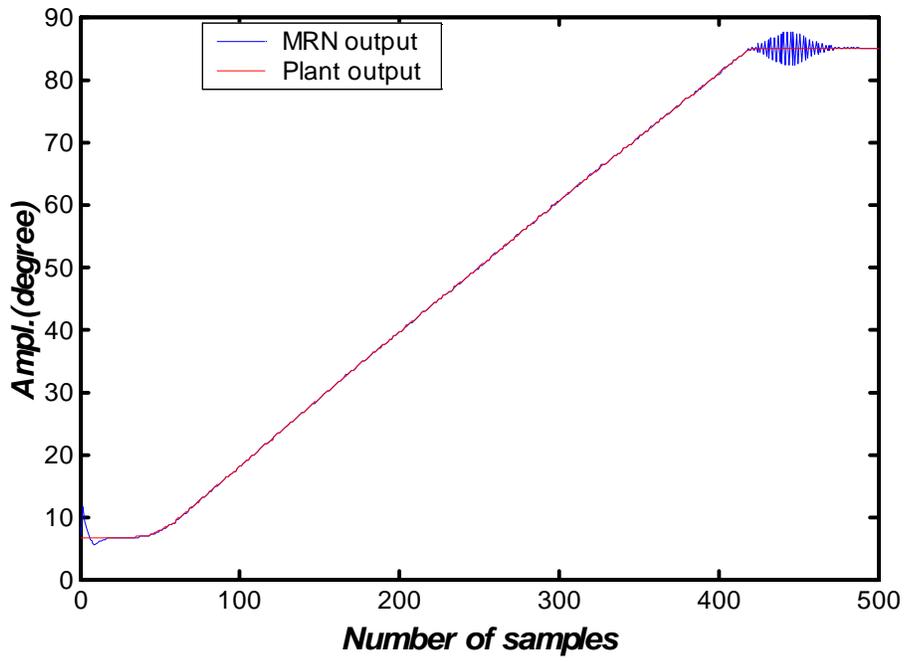
*Figure (8) parameter estimate of the RLS*



*Figure (9) parameter estimate of the RLS*



*Figure (10) parameter estimate of the RLS*



*Figure (11) response of the MRNN and the SS with large learning rate*

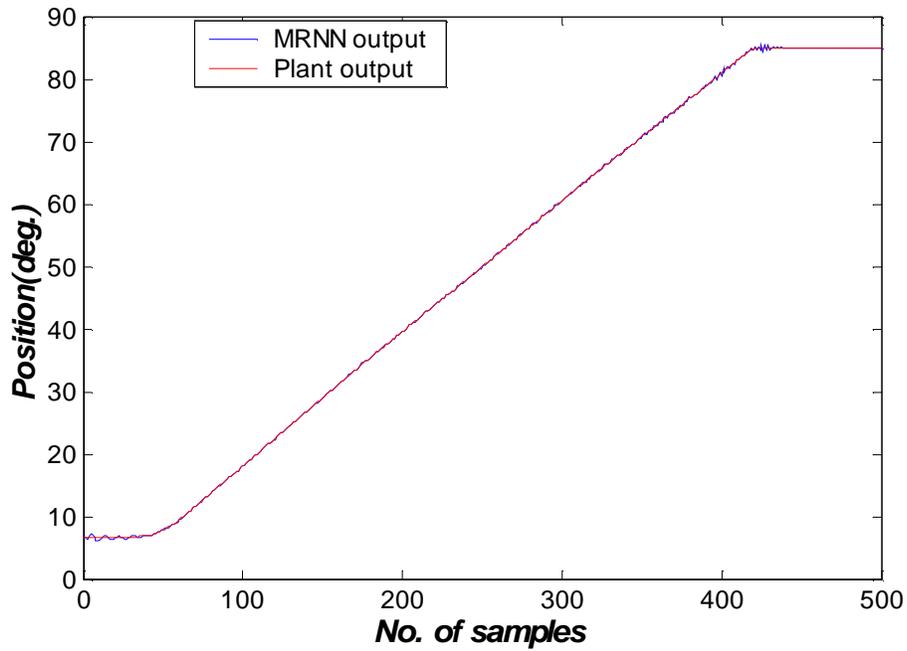
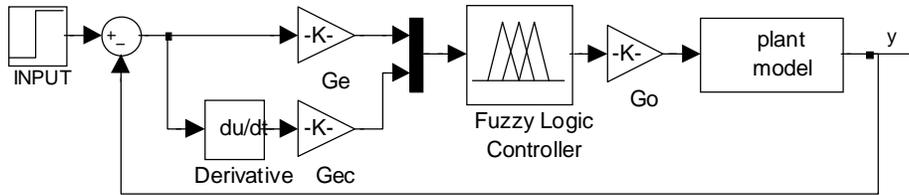


Figure (12) response of the MRNN and the SS

3. Design of PD Fuzzy Logic Controller:

The block diagram of the plant with the Proportional-Derivative Fuzzy Logic Controller is shown in figure (13).



### Figure (13) PD fuzzy logic controller

The inputs to the FLC is the position error  $e(k)$  and position error change,  $\Delta e(k)$  that is:

$$e(k) = r(k) - y(k)$$
$$\Delta e(k) = \Delta e = \frac{e(k) - e(k-1)}{T}$$

Where:

$r(k)$  is the reference input which represent desired angular position.

$y(k)$  is the process output which represent the actual angular position.

$T=(t_2-t_1)$  sampling period.

The output of the fuzzy controller is denoted by  $U(k)$ , which is the input to the plant.

In the simulation results, five triangular membership functions for each inputs and output variables are used, which are uniformly distributed across their universes of discourse for inputs and output membership functions. The fuzzy system is normalized which means the effective universes of discourse are all given by (-1,1). The linguistic values of these membership functions (for inputs and output) are NB, NS, ZR, PS, and PB which stand for (negative big, negative small, zero, positive small, and positive big respectively). The complete set of rules is shown in tabulated form in table (1), the premises for the input  $e(k)$  are represented by the linguistic values in the left-most column, the premises for the input  $\Delta e(k)$  are represented by the linguistic values found in the top row, and the linguistic values representing the consequent for each of the rules can be found at the intersections of the row and column of the appropriate premises. Table (1) is constructed based initially on the characteristics of the system, then they are fine-tuned by repeated trials, and this table represents abstract knowledge about how to control the process given the error and its derivative as input [12].

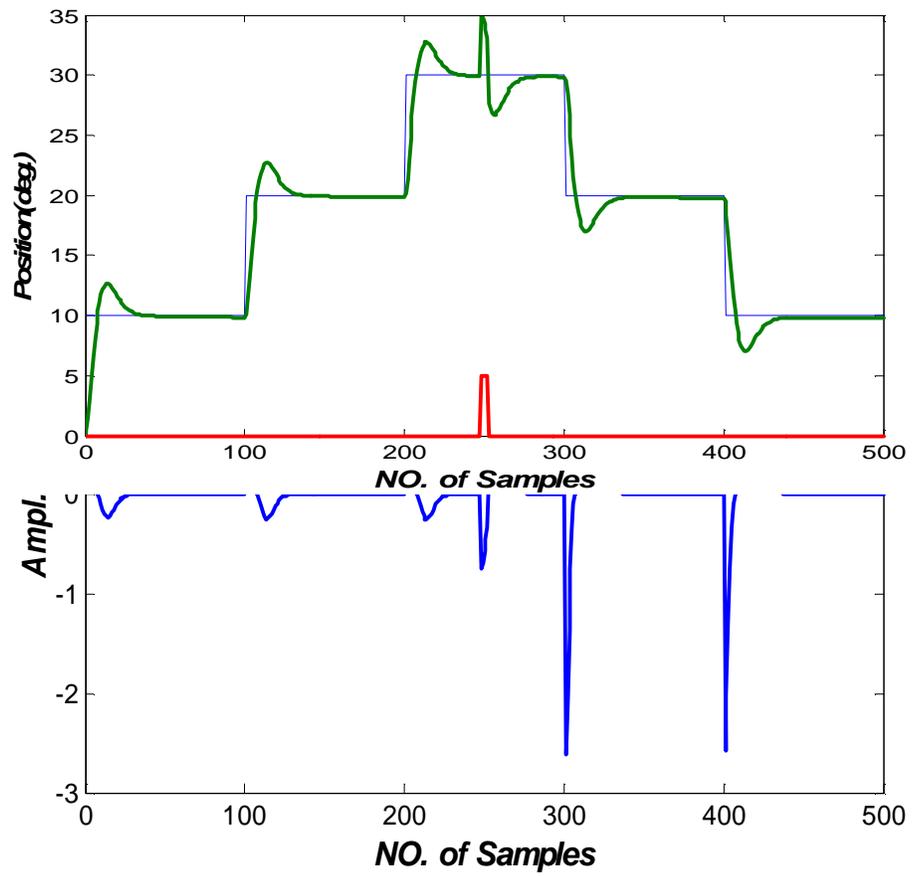
The fuzzy operation is executed using center of gravity (COG) defuzzification method. The controller was found to have best performance when the values of the scaling factors are ( $g_e = 0.29, g_{ec} = 0.09, g_o = 3$ ). This PD Fuzzy Logic Controller is used to control the position of the Servo System. The neuro-model obtained previously is used to represent the dynamic behavior of the actual SS. The SS response under PD FLC is shown in figure (14) and the controlled voltage of the FLC applied to the amplifier stage of the SS is traced in figure (15).

At sampling time 250, a step disturbance on the plant output of magnitude (5) was added, so the error is suddenly increases to make a high peak overshoot, as shown in figures (16) and (17). It is clear that the FLC is capable to handle this disturbance.

In the case of a conventional controller (such as PD controller) a design problem includes a proper choice of the PD controller coefficients. In the FLC design, one needs to choose many more parameters, number of rules, membership functions a scalar factors fuzzification and defuzzification procedures. These extra parameters make a FLC more robust and much more difficult for analysis [13].

Table (1)

Control Action		Change in error ( $\Delta e$ )				
		U	NB	NS	ZR	PS
Error (e)	NB	PB	PB	PB	PS	ZR
	NS	PB	PS	PS	ZR	NS
	ZR	PB	PS	ZR	NS	NB
	PS	PS	ZR	NS	NS	NB
	PB	ZR	NS	NB	NB	NB



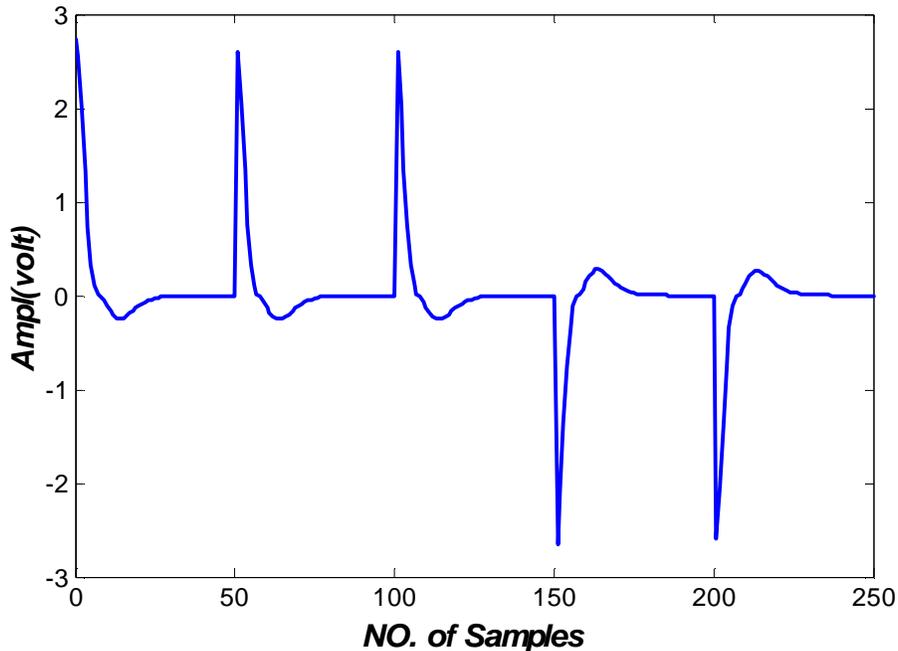
*Figure (14) the output of the SS under FLC*

*Figure (15) Control action of the FLC*

*Figure (16) the output of the SS under FLC with disturbance*

**Figure (17) Control action of the FLC with disturbance**

**4. Conclusion**



*From the results presented previously, one can state the following concluding points in the field of system identification that the MRNN is more suitable for modeling or emulating dynamic plant in comparison to the conventional RLS. This ability is more clarified in the case of the case of nonlinear and noisy collected input/output data.*

*One can conclude the following remarks in the analysis and design of fuzzy logic controllers:*

*1. Basically, from the conventional control theory, for the position servo systems which possesses big moment of inertia reflected to the motor shaft, the necessary of designing position becomes really important point. Therefore, for the SS under consideration such control system is essential even if one try to use classical PID controller. It is found that for the SS, the FLC is adequate to satisfy the performance requirements.*

2. To overcome the problem of system non-linearity or system parameter changes, it is recommended to use fuzzy controller that can cooperate and handle these changes.
3. The fuzzy logic controller seem to give high performance for the transient response and steady state characteristic, and shows a good robustness against external disturb

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