



Hamed Tolouei:

My name is H. Tolouei. I am from Iran. I was born in September, 1985, Isfahan. I received my Basic education in that city. After Entry M.S Exam of Iran Universities, in 2008, I entered K.N.Toosi university of technology, to study in electrical Engineering, majoring in control engineering. In 2012, I started to study Ph.D. in control Engineering under supervision of Dr. mahdi Aliyari in K.N.Toosi university of technology.

Research Interest:

- Nonlinear system identification in both classic and intelligent domain
- Neural Network identifiers and controllers
- Fault detection & diagnosis
- Design and Construction of Digital Controllers

M.Sc Thesis Title:

Identification and control of plasma radial motion in D-T system

Abstract:

Since many years ago, human beings have had a desire to achieve the source of an everlasting and non-polluted energy. Nowadays in the third millennium, this seemingly unattainable dream is going to become true. Thanks to the new innovations, human beings get ready to build their first nuclear fusion reactor and fulfill the wish of their ancestors. In this method hydrogen can be used in a nuclear reaction which produces a huge amount of energy and helium, as a totally safe byproduct.

In this project for the first time we achieve to control plasma radial motion in a desired path. By this control we can study the different parameters of plasma in a desired situation.

To identify the close loop model of plasma radial motion, at first we define the equations of actuator circuits. Then we study the plasma equations. Generally the equations of plasma are too complicated, so we cannot find a physical model for plasma radial motion. Instead of physical modeling we can model plasma motion by using identification techniques. One of the most important problems in plasma modeling is that we can not apply a complete PRBS as an input to identify the system, because each shot takes place in only 20ms. Thus in each shot some part of this signal was applied as an input.

For plasma modeling we design predictor and simulator models; for predictive model, we consider NARX architecture and for simulator, NOE model based on MLP neural network was implemented. Finally based on simulator model the PD controller was replaced by a nonlinear controller based on neural network and the results were compared with each other.

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