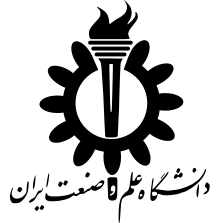
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| Industrial Control Systems Final project |
| by Arian Hajizadeh    Iran University of Science and Technology  Fall 2023 |
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# Introduction

This project was originally the final project for the industrial control systems course conducted by dr. Soheil Ganjefar, PhD in Iran University of Science and Technology at Fall 2023. In this project, using the knowledge acquired in class and considering the controller design process, an attempt has been made to first correctly identify the provided system using the mentioned methods. Then, an appropriate controller is designed and examined using the mentioned methods at the course. Finally, other methods are used to design a controller, and a comparison is made followed by a conclusion.

## Problem Description

The given system is as follows:

(1)

In this problem, the given system is a seventh-order denominator and first-order nominator system with a time delay. The task at hand is to perform the appropriate modeling and identification for this system using three- and four-parameter models. The approach employed is based on the theory taught during the course. System identification is carried out using the "ident" command. Additionally, the objective is to bring the system to the setpoint using the relay feedback method and obtain the desired parameters. The design of the controller is then accomplished using various methods, including the Ziegler-Nichols method in the time and frequency domains, the generalized Ziegler-Nichols method, and the lambda method. Finally, the system is estimated using the Smith predictor, and its performance is evaluated in two different scenarios.