MECH 523: Intelligent Control

Project Proposal

You are a control engineer who has been assigned the task of developing a fuzzy-logic controller for a practical engineering system. In the final project report you should describe the steps of development and implementation a fuzzy-logic controller for a selected plant (i.e., a process, a dynamic system) in sufficient detail. In particular, in the final report you should present the method and the results of generating the fuzzy rulebase, implementation of the fuzzy decision making system in the selected plant, evaluation of the performance of the plant after fuzzy control is included, comparison of the results with those when a conventional control approach is used, and recommendations for further improvement. In preparing for this project, you are requested to present a brief proposal (about three pages). In the project proposal please provide the following information:

1. Select a practical plant (process) that you are familiar with, which is the system to be controlled. Using sketches describe the main components of the plant and how your plant operates, clearly indicating the purpose of the plant. It is not necessary that this plant physically exists, as long as you are able to eventually (in the final report) describe it in sufficient detail, with parameter values, etc.

2. Give the operating requirements for the plant (i.e., specifications as to how the plant should behave under operating conditions, in carrying out its intended task) under proper control.

3. What are the measured responses (outputs) and the inputs of the system? In particular, what are the controlled inputs?

4. Indicate why fuzzy logic control may be appropriate for this plant.

5. Indicate what outputs and inputs of the process should be considered in a fuzzy decision making system.

Note: In the project you may use other approaches of soft computing (e.g., neural networks and evolutionary computing) as well, if you wish. You must, however, use fuzzy logic control in any event.

Note: The plant may be an existing physical system or an analytical model (a set of differential equations) of an engineering system.