ECE 414 - Take Home Test

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In this report five technical methods of design for controllers for G(s) plant are investigated. The plant itself is given to us in a form of randomly generated outputs from the function *ece414planttf.p*  set by the date of our birthday, in this case the 28th of December. There will be 100 plant G(s) where the nominal plant must be located to design each controller. Robust system that can manage to control the 100 plant of G(s).

**1. Root Locus**

The first technique is root locus. By investigation the option of the PID type controller we decide which best fit controller is to be designed. Because of the number zero’s in the plant only types PID and PIDF are feasible to be designed. A PI controller was chosen as candidate based on what was given as nominal plants.

**2. pidtune and pidtuner**

In this part, only the candidates PI and PIDF were considered for design on the bases of the possibility of PID that can achieved goal specification. A pidTuner use to generate the PID type plant. While pidTuner is used to open GUI interface and control the parameters of the PI and PIDF controller.

**3. pidtune with *pidsearch.m***

In this section, *pidsearch.m* is used to tonea *pidTune* control plant. It helped to optimize the baseline of the PID controller to control. The overshoot chosen to be the best to be control.

**4. Unity Feedback Linear Algebra design**

In this part of the report, a ***stepitae*** and ***stepshape*** wereused to generate a D(s) plant to control the nominal G(s) plant. With the help of the ***lamdesign***function, the result of the generated controller plan was generated and check if it met the unity feedback deign limitation.

**5.** **Two Parameter Linear Algebraic Controller Design**

For two parameters LAM, ***lamdesign***function was used. A plant generated using ***steplqr,*** the real roots of the plant used as vector to pass ***lamdesign*** to generate H(s) and F(s) plants.