# Ph.D. Qualifying Exam: Controls

Department of Mechanical Engineering University of Utah

**Exam Description:**

The qualifying exam covers the topics of Classical Controls. Students should be able to demonstrate their understanding across the variety of analysis and design tools available, including how they work and when they are appropriate to use. For example, students should understand and be able to apply concepts in dynamic models and response, block diagrams, stability, steady-state error, root locus, frequency response techniques, control system design using classical techniques, etc. Students need not be familiar with material related to state-space methods, nor material on discrete-time systems (i.e., z-transform).

**Recommended References:**

Students should study the material in a standard graduate textbook on feedback control (e.g., Franklin, Powell, and Emami-Naeini; Dorf and Bishop; Nise).

**Exam Materials:**

An equation sheet will be provided to students for their preparation before the exam. The same sheet will be provided with the exam. Students may bring a department issued calculator. No other materials will be allowed during the exam.