16.881 – Robust System Design

# Homework #1
# Variation and Its Economic Consequences

Due Date: Monday, June 8, 1:05-2:55 (the first meeting of 16.881)

Objectives:

- Provide motivation for the course by defining a *real* problem that we may be able to solve with robust design
- Prompt exploration of alternative term projects
- Stimulate thought about variation and its effect on your company

Assignment

1) Read "Robust Quality" by Taguchi and Clausing for a high level overview of the subject of this course
2) Form a team comprised of from one to five 16.881 students. The expected accomplishments of the team scale linearly with the number of students. You may wish to use this opportunity to form and build your term project team. I suggest you build teams with members of your own company if possible.
3) Select a system for investigation. For maximum impact, select a system that your company is responsible for designing, operating, or managing. You may wish to use this system as the subject of your term project as well. In this case, you should have some degree of control over the system so that you can perform experiments when you return to work later this summer. Senior management support for the investigation of the system is highly desirable as it will facilitate access for data collection.
4) Carefully define the function of the system. This function should have a quantitative definition insofar as possible.
5) Describe an undesirable variation in this function. By "variation", I mean a change in the function of the system upon repeated trials under ostensibly equal conditions. The variation can be over time, from unit to unit, or within a unit.
6) Investigate and quantify the economic consequences of the variation in this function.

Deliverables

Create a brief written and oral report of your results. The written report should be no more than two pages per team member. The oral report should be no more than two minutes per team member.