

**553.633/433**

**Homework #2**

**Due Wed. 9/13/17**

Five problems:

1.8

1.10

1.13

A. Consider a function,  $y(\boldsymbol{\theta}) = \boldsymbol{\theta}^T \boldsymbol{\theta} + V^2[1, 2]\boldsymbol{\theta}$ , where  $\boldsymbol{\theta} \in \mathbb{R}^2$  and  $V$  is a random variable with distribution  $N(2, 8)$ . First, find the minimum  $\boldsymbol{\theta}$  to  $L(\boldsymbol{\theta}) = E[y(\boldsymbol{\theta})]$ . Then, find the minimum to the function resulting from replacing  $V$  by its mean value (i.e., the “flaw of averages”). Compare the values of  $L(\boldsymbol{\theta})$  for the two solutions. Comment on why the two solutions differ.

B. Exercise 4 in week 1 handout (file MonteCarlo\_intro\_handout.pdf, corresponding to slides shown in class). Write your own code (submit code with homework).