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1.010 Uncertainty in Engineering  
Fall 2008

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**1.010 – Mini-Quiz #3**  
(40 min – open books and notes)

**Problem 1 (33 points)**

A random variable  $X$  has uniform distribution between  $-1$  and  $1$ . This means that the PDF of  $X$  is

$$f_X(x) = \begin{cases} 0.5, & \text{for } -1 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

Find the CDF of  $Y = |X|$ .

**Problem 2 (33 points)**

A chain is made of  $n$  links with independent and identically distributed strengths  $X_1, X_2, \dots, X_n$ . If the distribution of the  $X$ 's is uniform between  $0$  and  $1$ , find and plot the CDF of the strength of the chain,  $Y$ , for  $n = 2$  and  $n = 10$ .

**Problem 3 (33 points)**

Your PC can simulate random variables  $U$  with uniform distribution between  $0$  and  $1$ . How can you simulate a random variable  $X$  with CDF given by

$$F_X(x) = \begin{cases} 0, & x \leq 0 \\ x^2, & 0 < x < 1 \\ 1, & x \geq 1 \end{cases}$$