Problem 1: Consider a single degree of freedom system with $m = 1$, $k = 1$, $\zeta = 0.05$ forced by a random forcing function with mean $\mu_F = 0$ and Markov spectrum with $\sigma = .25$, $\beta = 1$.
(a) Compute the variance of the displacement response
(b) Compute the upcrossing rate for $\xi = 1.25$. (c) Compute the probability that the first upcrossing of $\xi = 1.25$ occurs before $t = 200s$. (d) Show samples of the forcing function and response

Problem 2: Consider an undamped SDOF system with $M \sim N(1,.01)$, $K \sim N(1,.01)$ forced by a random forcing function with narrow band properties such that the only non-zero power lies between 1.25 and 1.5 rad/s. Compute the probability that the system will be resonant.