Economics 690
Problem Set: Using the Metropolis-Hastings Algorithm

(1) Consider, again, the problem of sampling from a triangular distribution:

$$p(\theta) = 1 - |\theta|, \quad \theta \in [-1, 1].$$

(1a) Generate 50,000 samples from the triangular density via a *random walk Metropolis-Hastings* approach. To be specific, use

$$\mathcal{N}(\theta^{t-1}, c)$$

as your proposal density.

Run the M-H algorithm for 51,000 iterations, discard the first 1,000 as the burn-in period, and plot a histogram of the final 50,000 simulations. Comment on the performance of the algorithm when $c = .5$ and $c = 10$. (Nothing fancy is required here; just "eyeball" the histogram against the known shape of the triangular density).

(1b) Do the same thing as in part (a), but this time employ an *indpendence MH chain* using a

$$\mathcal{N}(0, c)$$

proposal density. (Otherwise, proceed in the same was as described in part a).