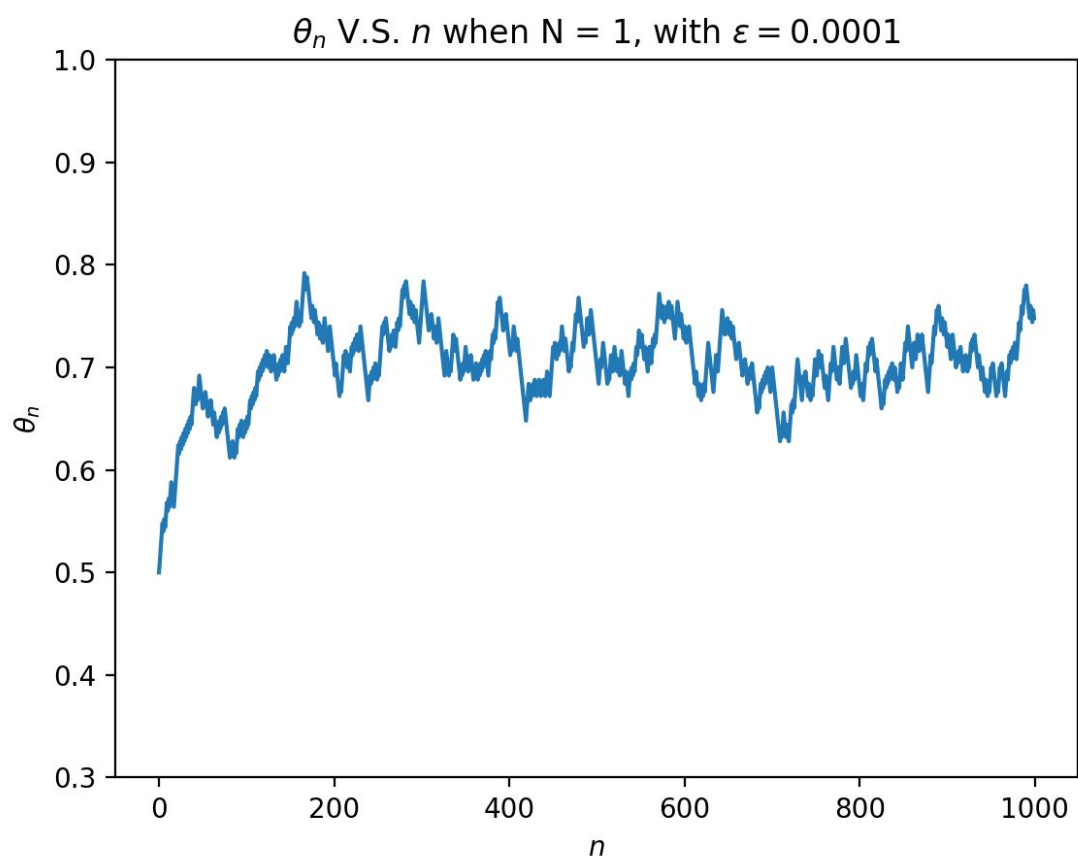
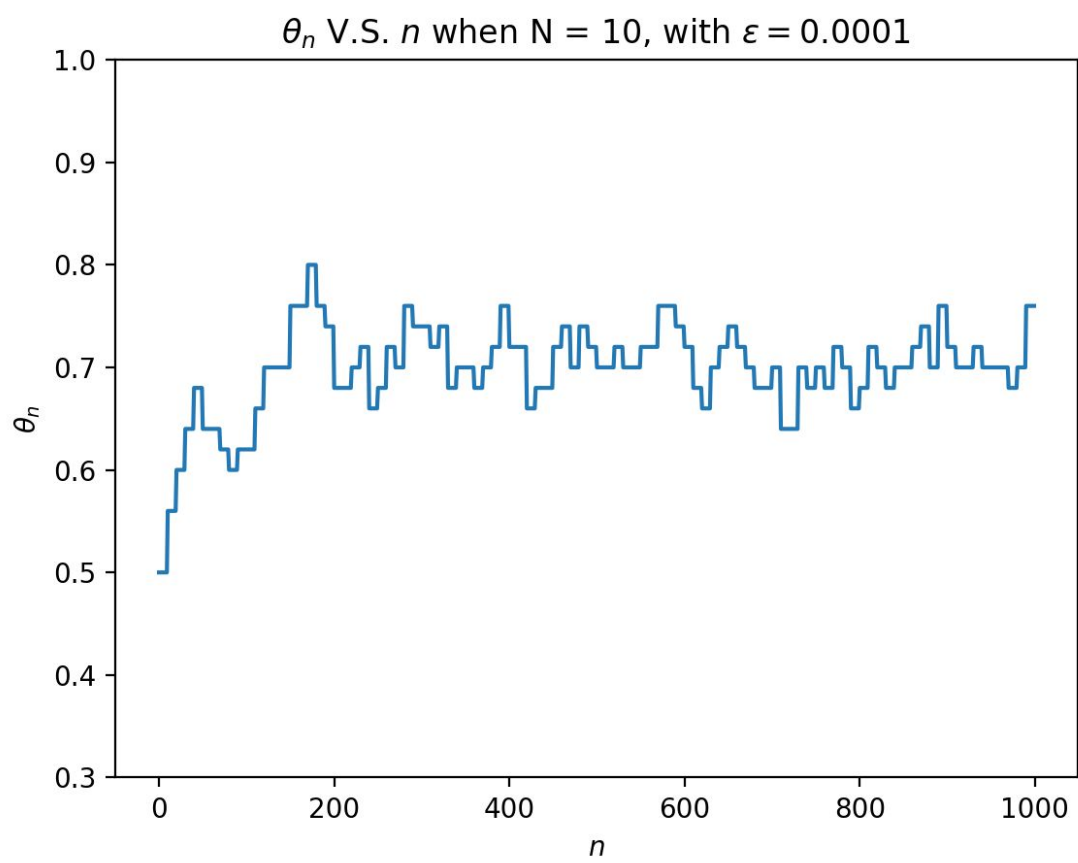
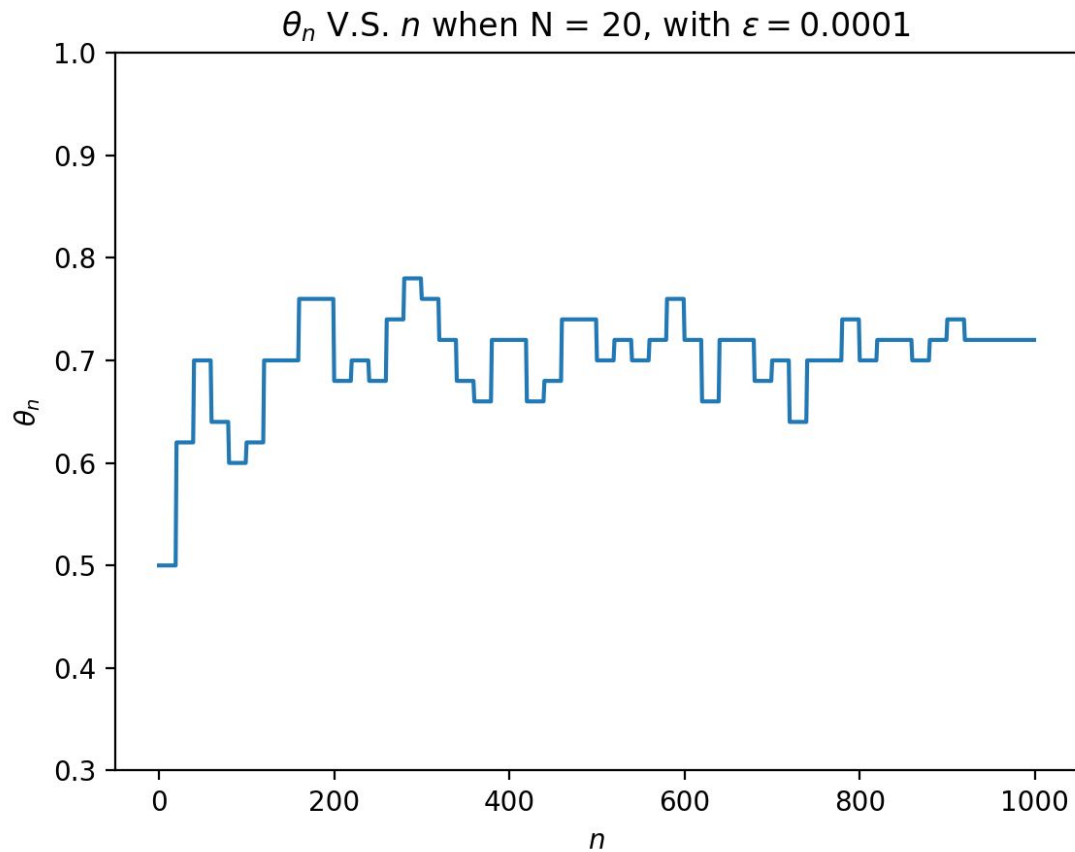


**Discussion 1:**

For the heart beating controlling problem, the initial plot is not clear. Here is the updated one. For the first three plots, the  $\epsilon$  is fixed as 0.0001.  $N=1,10,20$  separately. From the results, we can find that when  $N$  is smaller, there are more variance of the result which makes lots of sense as when  $N$  is larger, the result is averaged.







### Discussion 2:

In the following there plots,  $\varepsilon$  is initialized as 0.001 , and it decreased as initialized value where  $n$  is the iteration number. From the result we can see the decreasing  $\varepsilon$  method has a better convergence result. Same as the fixed  $\varepsilon$ , when  $N$  is larger, the variance is reduced.

### Discussion 3:

From the result, we can see the decreasing  $\varepsilon$  method is better as it has a better convergence result. So it will be patented.

