In this project, I implemented the function *getPdf*, *getEuropean*, *testGetPdf* and *testGetEuropean*.

One of the biggest issues I faced was MATLAB programming. I didn’t have much experience in MATLAB programming, and actually it was covered only to a bare minimum in FE5116. Therefore, to better complete the project, I watched the MATLAB tutorial videos on Youtube, and read the related documentations on MathWorks.

Another difficulty was to determine the value of *h* used in the numerical derivative. I understood from the lecture that when *h* decreases, there is a trade off between reduction of truncation error and growth of rounding error. One way to find an optimal value of *h*, which achieves the best possible accuracy, is to plot the total error in logarithmic space. However, in this project, since the exact value of the probability density function was unavailable, we were unable to do it this way. To address this issue, I plotted the value of the probability density function instead, by implementing the function with T=0.8, Ks=fwd, and using bump size raging from 1e-16 to 1e+0. From the figure below, I found that the value of the probability density function decreased wiggly at first and became stable thereafter. Therefore, I deem the use of h=0.0001 to be reasonable.

