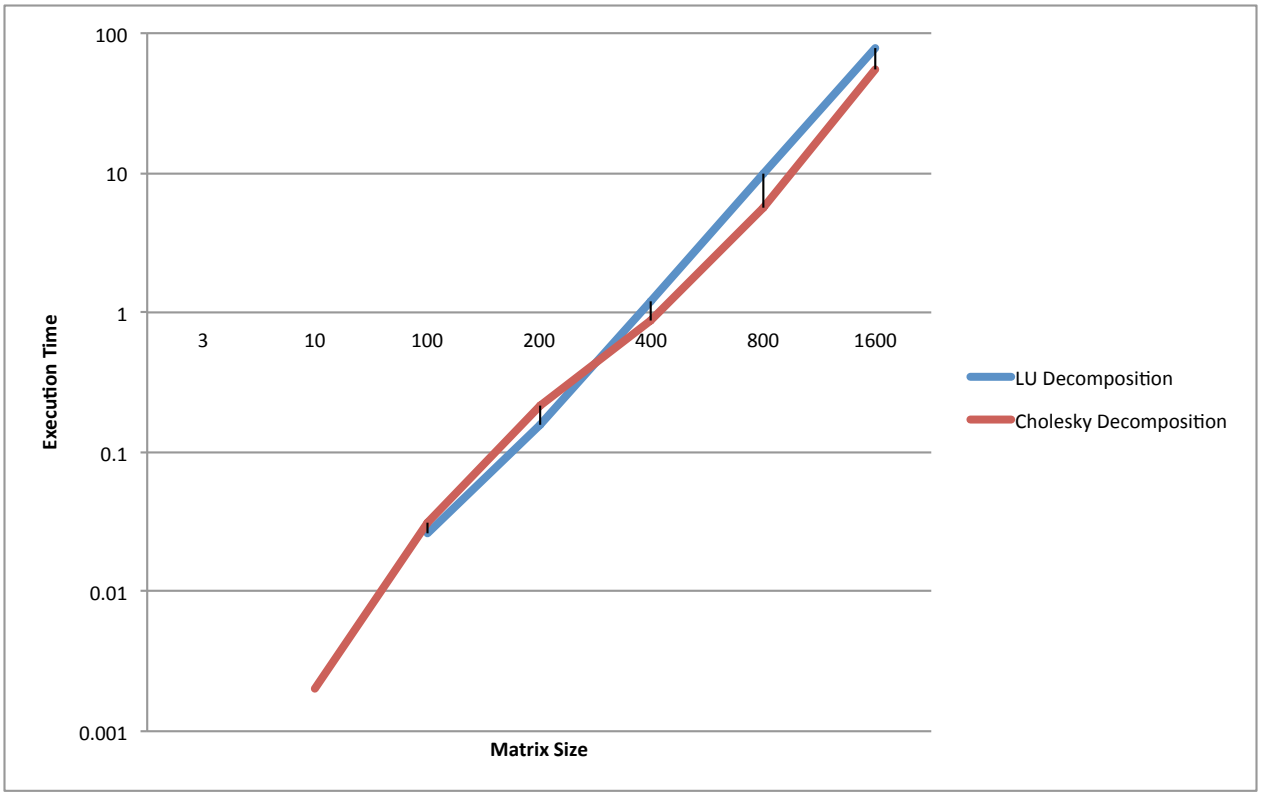
邱名彰 100060007

HW03

For both LU decomposition and Cholesky decomposition, the time complexity shall all be O(n^3) theoretically and the only difference should lie in the coefficient. In addition, Cholesky method should be faster than the other one as we have seen from Professor Chang's lectures. We can observe from the plot below that the Cholesky method is unquestionably O(n^3) since the time trend of Cholesky method is approximately the same as that of LU method.

For the computation of matrices larger than 400 dimensions, Cholesky method does out-perform the other one, so in general, Cholesky method shall be more efficient than the LU method. The reason why Cholesky method is less competitive than LU method in my case when matrix sizes are less than 200 may reside in the implementation of Cholesky or the instability of workstation—the execution time for them may be too instant to be conspicuously distinguished.



Note: the missing points for LU and Cholesky method when matrix sizes are 3 and 10 are resulted from the unmeasurable time durations(i.e. 0s), which are too short to be collected by computers and cannot be plotted.

Matrix Size	3	10	100	200	400	800	1600
LU	0	0	0.026	0.156	1.219	9.895	78.276
Cholesky	0	0.002	0.031	0.218	0.877	5.612	54.396