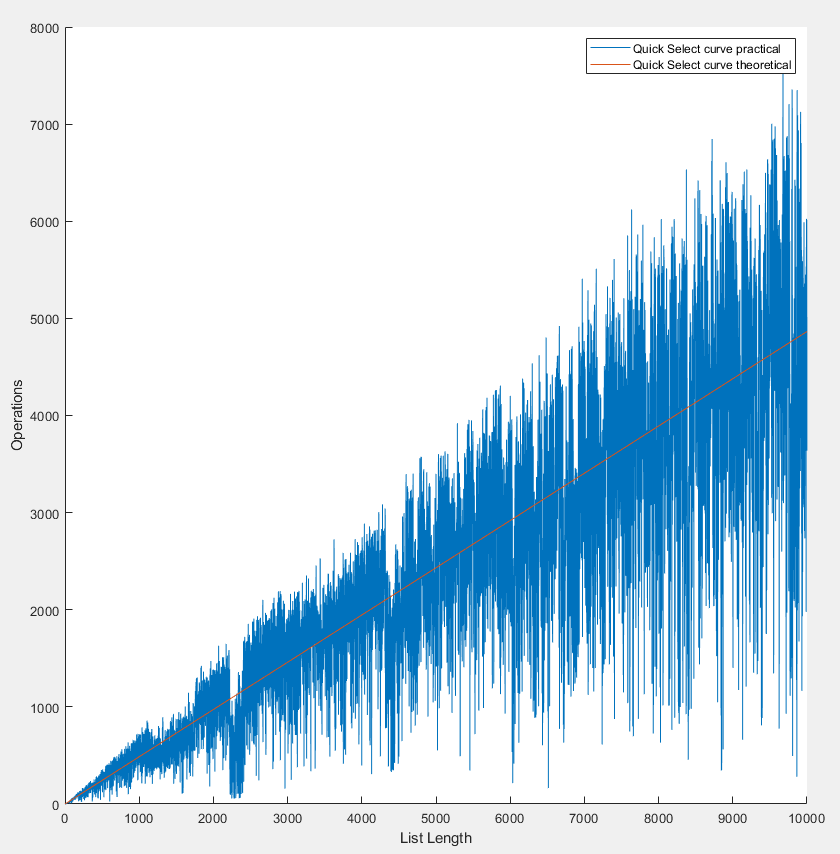
Portfolio 2

# 1:

Theoretical line is plotted using function: where factor is to get the two graphs intersect each other in endpoints. The practical data is a variable counted one up each time perculate\_down is called after buildheap is done. It can be seen from the plot that the data follow pretty good

# 2:



Theoretical line is plotted using function: where factor is to get the two graphs intersect each other in endpoints. The practical data is a variable counted one up each time it swaps in the while(true) inside quick\_select. This means we do not count one up if it is using insertions\_sort (only for small list sizes). It can be seen from the plot that the operations vary a lot. This is due to the list generated is random which mean if the list is nearly sorted, the operations used is few. The tendency of the graph is linear.

# 3: Bevis average case quick select

Average case:

(1)

Multiple by N:

(2)

Substitute N with N-1:

(3)

Subtract (3) from (2):

Rearrange and drop insignificant c:

(4)

(5)

Divide equation (5) by N:

(6)

Telescope:

Adding all equations:

(7)