In this note we explore the problem of the average value of the sum of the maximum contiguous subarray in a randomly generated sequence of a given length.

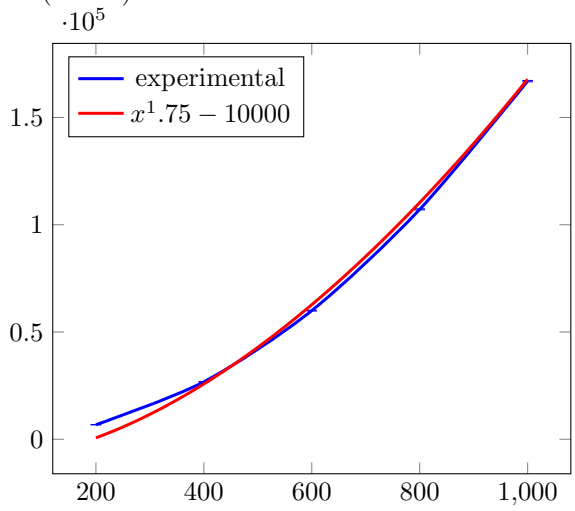
1 Problem statement

The *sum of a maximum contiguous subarray* of a given sequence is a value - i.e. elements are chosen in the same order as they appear in the given sequence. The problem is to find the largest sum among such subsequences.

An interesting question is – given a randomly generated sequence what is the average value of its maximum contiguous array.

2 Experiment setup

To generate a sequence of length N each element is independently generated using uniform distribution of integers in the range $[-N/3, 2N/3]$. For each N we performed 1000 experiments. The blue graph below shows the average value of the maximum contiguous subarray plus-minus standard deviation. The red graph shows function $(x^1.75)$ which grows almost at the same rate, supporting the hypothesis that average value of the maximum contiguous subarray of size N is $O(N^1.75)$.



Matthew Oliver