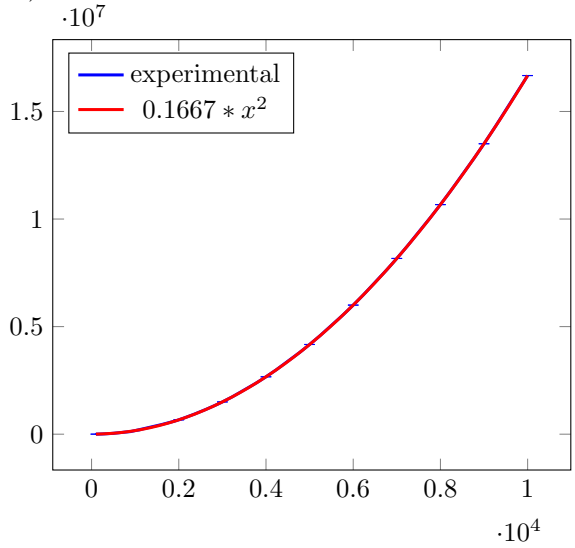
In this note we explore the problem of the maximum sub array sum in a randomly generated sequence of a given length.

1 Problem statement

The *Maximum Sub-array Sum* problem involves identifying a contiguous segment within a one-dimensional array that yields the highest sum. The problem is to pinpoint the subarray whose elements, when combined, produce the greatest total value out of all potential subarray combinations.

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 200 experiments. The blue graph below shows the maximum sub array sum plus-minus standard deviation using Kadane's algorithm. The red graph shows function 0.1667 * x^2 which grows almost at the same rate, supporting the hypothesis that average sum of maximum sub array of size N is $O(N^2)$.



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