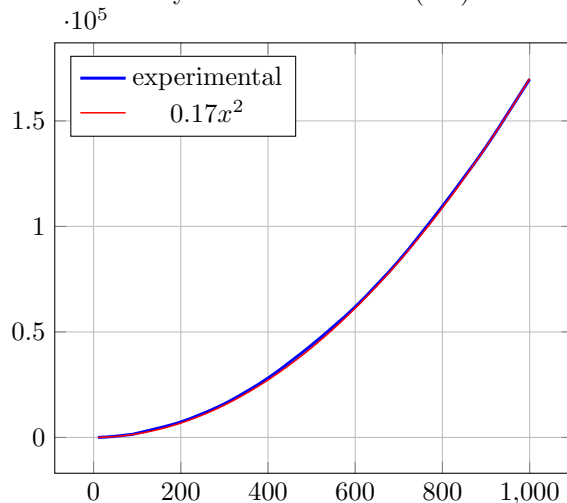In this note we explore the problem of finding the maximum subarray sum in a randomly generated sequence of a given length.

1 Problem Statement

The *maximum subarray sum* of a given one-dimensional array of numbers that is randomly generated. The problem is to find the contiguous subarray within the array that has the largest sum.

2 Experiment Setup

For each problem size N, we create an array of size N and initialize its values. The values are generated within the range $[-\frac{N}{3}, \frac{2N}{3}]$. For each N, we performed 1,000,000 experiments. The blue graph below shows the maximum value of maximum subarray sum. The red graph shows function $0.17x^2$ which grows almost at the same rate, supporting the hypothesis that maximum sum of the maximum subarray sum of size N is $O(N^2)$.

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