Title: Solution path for a shifted maximum subarray problem

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Abstract: The maximum subarray problem is the task to locate a contiguous subarray with the greatest sum, within a given one-dimensional array. In this talk, we investigate a variant of maximum subarray problem, called shifted maximum subarray (SMS) problem, which studies the maximum subarray when all the values in the original array are shifted by a quantity, say λ. We characterize and implement the calculation of the full solution path of the SMS problem when λ varies. Moreover, we illustrate an important application of the SMS solution path to the problem of epidemic change-point detection. Calculating the exact value of the classic test statistic of testing for an epidemic change usually requires $O(n^2)$ operations when the input sequence is of length n. Our implementation is much faster and makes computationally intensive methods feasible for big data.