

A DIVIDE AND CONQUER APPROACH TO COMPUTING THE MEAN FIRST PASSAGE MATRIX FOR MARKOV CHAINS VIA PERRON COMPLEMENT REDUCTIONS

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Abstract

Let M_T be the mean first passage matrix for an n -state ergodic Markov chain with a transition matrix T . We partition T as a 2×2 block matrix and show how to reconstruct M_T efficiently by using the blocks of T and the mean first passage matrices associated with the nonoverlapping Perron complements of T . We present a schematic diagram showing how this method for computing M_T can be implemented in parallel. We analyze the asymptotic number of multiplication operations necessary to compute M_T by our method, and show that for large size problems, the number of multiplications is reduced even if the algorithm is implemented in serial.

This is joint work with Professor S. J. Kirkland of the University of Regina, Canada, and Mr. Jianhong Xu of the University of Connecticut, Storrs, Connecticut, USA.