

Representing Probability Vectors Compactly*

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Abstract

The transition rate matrix associated with a multi-dimensional Markov chain having a relatively large reachable state space [3] can be represented compactly using Kronecker products [1]. Nevertheless, probability vectors employed in the numerical analysis of such representations are still proportional to the size of the reachable state space. As the number of dimensions increases, this size increases exponentially, and therefore, poses a challenge. The current talk shows that it is possible to store probability vectors during numerical analysis relatively compactly using higher-order singular value decomposition [4]. Yet, the basic operation of vector-Kronecker product multiplication [2] can still be performed relatively efficiently. Furthermore, larger space savings are obtained as the number of dimensions increases.

Keywords

Markov chains, Reachable state space, Kronecker products, Higher-order singular value decomposition.

References

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