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## Reaching a Nonlinear Consensus: Polynomial Stochastic Operators

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### Abstract

We provide a general nonlinear protocol for a structured time-varying and synchronous multi-agent system. We present an opinion sharing dynamics of the multi-agent system as a trajectory of a polynomial stochastic operator associated with a multidimensional stochastic hypermatrix. We show that the multi-agent system eventually reaches to a consensus if either one of the following two conditions is satisfied: (i) every member of the group people has a positive subjective opinion on the given task after some revision steps or (ii) all entries of a multidimensional stochastic hypermatrix are positive. Numerical results are also presented.

### Keywords

**Author Keywords:** [Multidimension stochastic hypermatrix](#); [nonlinear consensus](#); [polynomial operator](#)

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