# CONVERGENCE ISSUES OF ITERATIVE AGGREGATION/DISAGGREGATION METHODS IN PRESENCE OF CYCLIC PARTS IN THE SPECTRUM OF THE ITERATION MATRIX

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**Abstract**

Many methods designed for computing eigenvalues and eigenvectors share one characteristic and namely that their convergence similarly as the power method requires the computed eigenvalue to be the dominant point of the spectrum of the iteration matrix. To computing eigenvectors of stochastic matrices this requirement is easy to achieve by using matrix $\frac{1}{1+\gamma}[T+\gamma I], \gamma > 0$, in place of the original iteration matrix $T$. This procedure stops being efficient if the index of cyclicity of $T$ becomes large. In this report we show that various variants of iterative aggregation/disaggregation (IAD) methods [1] remain convergent independent of the index of cyclicity of the corresponding iteration matrix. This fact allows us to claim that IAD methods possess the following property: The larger index of cyclicity of the iteration matrix the faster convergence. We give a proof of an appropriate convergence result and accompany it by a rather large number of computations showing the efficiency of IAD methods.

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## References

[1] I. Marek, P. Mayer, *Convergence theory of a class of aggregation/ disaggregation iterative methods for computing stationary probability vectors of stochastic matrices.* Linear Algebra Appl., 363 (2002) pp. 177–200.