Evaluation of Matrix Algebra Methods for Calculating Transformities from Ecological and Economic Network Data

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ABSTRACT

This paper describes and characterises matrix algebra methods for calculating transformities from ecological and economic network data. Particular attention is given to those characteristics of complicated energy-flow and mass-flow networks that lead to the following methodological problems: joint production (co-products), non-square matrices (unequal number of processes and quantities), matrix singularity, problematic occurrence of negative transformities in the solution vector, and unequal energy efficiencies which frequently occur in non-square matrices. Each of these problems is discussed and the means of resolving these problems are consequently presented. In addressing these problems, besides covering the use of the previously reported matrix inversion, regression, eigenvalue–eigenvector and singular value decomposition methods; a new method – the reflexive method – is introduced.

Citation

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