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Graph theory and economic models: from small to large size applications. (English)

Summary: This empirical study explores the structure of macroeconomic models using major concepts and algorithms of the graph theory. Different sizes of applications with dynamic effects are considered. We will firstly examine the matching problem when assigning the equations to the variables. We’ll also propose a simple method for improving the regular circular embedding of graphs on the basis of one of the longest circuit and adequate permutations. The determination of the maximal list of edge-disjoint circuits also produces an useful insight into the structure.

A typology of the interdependent variables is proposed using the all-pairs shortest paths matrix. This classification is based on both the emissions of nodes towards the rest of the directed graph and the perturbations that the rest of the graph exerts on these nodes. The computations have been done using the softwares MATHEMATICA 5.1, LINDO 6.1 and our own programs in Fortran 77L and C++.

For the entire collection see [Zbl 1109.05007].

MSC:

05C90 Applications of graph theory
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)
05C70 Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
05C38 Paths and cycles
91B64 Macroeconomic theory (monetary models, models of taxation)

Keywords:

macroeconomic model; directed graph; strong component (SC); longest circuit; directed acyclic graph (DAG); edge-disjoint circuits; eccentricity; in-eccentricity; all-pairs shortest paths; typology

Software:

LINDO; Mathematica

Full Text: DOI

References:


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