

EXTENSIONAL ACYCLIC DIGRAPHS AND SET GRAPHS

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A digraph is called ‘extensional’ if its vertices have pairwise distinct (open) out-neighborhoods. Extensional acyclic digraphs originate from set theory where they represent transitive closures of hereditarily finite sets.

We will present some results concerning the underlying graphs of extensional acyclic digraphs, which we call ‘set graphs’. Even though we argue that recognizing set graphs is NP-complete, we show that set graphs contain all connected claw-free graphs and all graphs with a Hamiltonian path. In the case of claw-free graphs, we provide a polynomial-time algorithm for finding an extensional acyclic orientation.

Extensional digraphs can also be characterized in terms of a slight variation of the notion of separating code, which we call open-out-separating code. Concerning this, deciding if a digraph admits an open-out-separating code of given size is NP-complete.