

Set Graphs. III. Proof Pearl: Claw-Free Graphs Mirrored into Transitive Hereditarily Finite Sets

Eugenio G. Omodeo · Alexandru I. Tomescu

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Abstract We report on the formalization of two classical results about claw-free graphs, which have been verified correct by Jacob T. Schwartz’s proof-checker *Referee*. We have proved formally that every connected claw-free graph admits (1) a near-perfect matching, (2) Hamiltonian cycles in its square. To take advantage of the set-theoretic foundation of *Referee*, we exploited set equivalents of the graph-theoretic notions involved in our experiment: edge, source, square, etc. To ease some proofs, we have often resorted to weak counterparts of well-established notions such as cycle, claw-freeness, longest directed path, etc.

Keywords Claw-free graph · Theory-based automated reasoning · Proof-checking · Referee

1 Introduction

In this paper we report about a computer-checked proof of two classical results on connected claw-free graphs [4, 5], specifically the facts that any such graph

- owns a perfect matching if its number of vertices is even [45, 50];
- has a Hamiltonian cycle in its square [32].

E. G. Omodeo (✉)
DiGe/DMI, Università di Trieste, Via Valerio, 12/1, 34127 Trieste, Italy
e-mail: eomodeo@units.it

A. I. Tomescu
DiMI, Università di Udine, Via delle Scienze, 206, 33100 Udine, Italy

A. I. Tomescu
FMI, University of Bucharest, Str. Academiei, 14, 010014 Bucharest, Romania
e-mail: alexandru.tomescu@uniud.it