

Decision of Soccer Score Sequences

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Antal Iványi proposed the following question for the Egerváry research group [1]: in a soccer tournament of teams, every pair of teams plays one match. The winner gets 3 points, the loser gets 0, while both teams receive 1 point in case of a draw. Is there a polynomial algorithm to decide whether a given score sequence (a score for each team) can be the score sequence at the end of a valid championship?

Notes: if the tournament graph (the graph of the matches played) is not a complete graph, but also part of the input, then the problem is NP-complete [2]. If the winner gets 2 points, the problem becomes a graph orientation problem with known polynomial algorithms even in the latter general case.

References

- [1] http://www.cs.elte.hu/egres/problems/prob_17/prob_17.html
- [2] Pálvölgyi, Dömötör. *Deciding soccer scores and partial orientations of graphs*, Acta Universitatis Sapientiae. Mathematica 1.1 (2009): 35–42.