

On the threshold bias of the Oriented-cycle game

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Abstract

In the Oriented-cycle game, the two players, called OMaker and OBreaker, alternately direct edges of the complete graph on n vertices. OMaker directs exactly one edge, whereas OBreaker is allowed to direct between one and b edges in each round. OMaker wins if the final tournament contains a directed cycle, otherwise OBreaker wins. It is not that difficult to see that OMaker has a winning strategy for this game whenever $b < n/2 - 2$, whereas OBreaker wins for $b > n - 3$. We show that OBreaker has a strategy whenever $b > 5n/6$. Moreover, we also show that in a variant, where OBreaker is asked to direct exactly b edges in each round, OBreaker wins whenever $b > 19n/20$.

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