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A pairing strategy for tic-tac-toe on the integer lattice with numerous directions. (English)

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Summary: We consider a tic-tac-toe game played on the d -dimensional integer lattice. The game that we investigate is a Maker–Breaker version of tic-tac-toe. In a Maker–Breaker game, the first player, Maker, only tries to occupy a winning line and the second player, Breaker, only tries to stop Maker from occupying a winning line. We consider the bounded number of directions game, in which we designate a finite set of direction-vectors $\mathcal{S} \subset \mathbb{Z}^d$ which determine the set of winning lines. We show by a simple pairing strategy that Breaker can win this game if the length of each winning line is at least $3|\mathcal{S}|$. It should be noted that Breaker’s winning strategy can be used as a drawing strategy for Player 2 in the strong version of this game.

MSC:

91A46 Combinatorial games

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