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**Klay T Kruczek\*** ([kruczekk@wou.edu](mailto:kruczekk@wou.edu)), Mathematics Department, Western Oregon University, 345 N. Monmouth Avenue, Monmouth, OR 97361. *On the Use of Fractional Matchings to Find Pairing Strategy Draws in  $N^d$  Tic-Tac-Toe.*

We will discuss the standard two-player  $N^d$  Tic-Tac-Toe game. In particular, we will concern ourselves with Player 2's ability to force a Pairing Strategy Draw (PSD), where he is able to pair off a subset of the points so that each winning line is assigned its own pair of points. It is known that if  $N < \frac{2}{\ln 2}d - 1$ , there is no PSD. On the other hand, with a very short proof, we are able to show that if  $N \geq 3d - (d \bmod 2)$ , then the second player can force a draw by employing a pairing strategy after he finds a fractional matching of the points to the lines. Using similar methods and a much longer proof, one can show that if  $N \geq 3d - O(\sqrt{d})$ , then a PSD exists. (Received September 14, 2010)