

On Differences between Fractional and Integer Order Differential Equations for Dynamical Games

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We argue that fractional order differential equations are more suitable to model complex adaptive systems. Hence they are applied in replicator equations for non-cooperative games. Rock-scissors-paper game is discussed. It is known that its integer order model does not have a stable equilibrium. Its fractional order model is shown to have a locally asymptotically stable internal solution. A fractional order asymmetric game is shown to have a locally asymptotically stable internal solution. This is not the case for its integer order counterpart.

Key words: Fractional Order; Non-Cooperative Game.