

Totalitarian random Tug-of-War games and Jensen's extremal equations

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Abstract

In this talk we will discuss a new random Tug-of-War game in which one of the players has the power to decide at each turn whether to play a round of classical random Tug-of-War, or let the other player choose the new game position in exchange of a fixed payoff.

We prove that this game has a value and show that it is related to Jensen's extremal equations, which have a key role in Jensen's celebrated proof of uniqueness of infinity harmonic functions. These PDE can also be obtained as a limit of certain p -Laplace equations; however, this is the first time that such equations are found to have a connection with game theory.

Our analysis relies on comparison and viscosity tools, in contrast to probabilistic arguments which are more common in the literature. This is a joint work with Marcos Ant3n-Amayuelas.