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Micah W. Warren*, Dept of Mathematics, 1222 University of Oregon, Eugene, OR. *Continuum Nash Bargaining Solutions.*

Nash's classical bargaining solution suggests that n players in a non-cooperative bargaining situation should find a solution that maximizes the product of each player's utility functions. We consider a special case: Suppose that the players are chosen from a continuum distribution μ and suppose they are to divide up a resource ν that is also on a continuum. The utility to each player is determined by the exponential of a distance type function. The maximization problem becomes an optimal transport type problem, where the target density is the minimizer to the functional which is the sum of an entropy term and a Wasserstein distance term, similar to the minimization problem solved in the Jordan-Kinderlehrer-Otto scheme. Thanks to optimal transport theory, the solution may be described by a potential that solves a fourth order nonlinear elliptic PDE, similar to Abreu's equation. Using the PDE, we prove solutions are smooth when the measures have smooth positive densities. (Received January 19, 2018)