

BNE and Auction Theory Homework

1. For two agents with values $U[0, 1]$ and $U[0, 2]$, respectively:
 - (a) show that the first-price auction is not socially optimal in BNE.
 - (b) give an auction with “pay your bid if you win” semantics that is.
2. What is the virtual value function for an agent with value $U[0, 2]$?
3. What is revenue optimal single-item auction for:
 - (a) two agents with values $U[0, 2]$? n agents?
 - (b) two agents with values $U[a, b]$?
 - (c) two values $U[0, 1]$ and $U[0, 2]$, respectively?
4. For n agents with values $U[0, 1]$ and a *public good*, i.e., where either all or none of the agents can be served,
 - (a) What is the revenue optimal auction?
 - (b) What is the expected revenue of the optimal auction?
(use big-oh notation)

<http://www.eecs.northwestern.edu/~hartline/amd.pdf>