6.896 Topics in Algorithmic Game Theory February 3, 2010

Lecture 1

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1 Preliminaries

A two-player game is formally defined as follows.

Definition 1. *A* 2-player game *is defined by a pair of $m \times n$ payoff matrices (R, C), whose rows correspond to the strategies of one of the players of the game, called the* row player*, and whose columns correspond to the strategies of the other player, called the* column player*. The strategy sets of the row and column players are identified respectively with the sets $[m] := \{1, \ldots, m\}$ and $[n] := \{1, \ldots, n\}$.*

The following theorem was established by John Nash in 1951 [1].

Theorem 1. *Every game has a Nash equilibrium.*

References

[1] J. Nash. Noncooperative Games. *Annals of Mathematics*, 54:289–295, 1951.