Zero Sum Games

Tutorial 4 Solutions

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Write down expressions for utility.

$$\pi_1(p, R) = pu_1(T, R) + (1-p)u_1(B, R) = -4p + 1 \tag{1}$$
$$\pi_1(p, R) = pu_1(T, L) + (1-p)u_1(B, L) = 3p - 1 \tag{2}$$
$$\pi_1(T, q) = 5q - 3 \tag{3}$$
$$\pi_1(B, q) = -2q + 1 \tag{4}$$

Plots

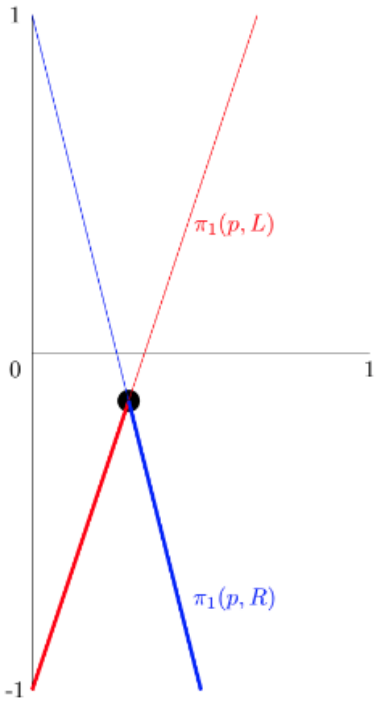

Figure 2

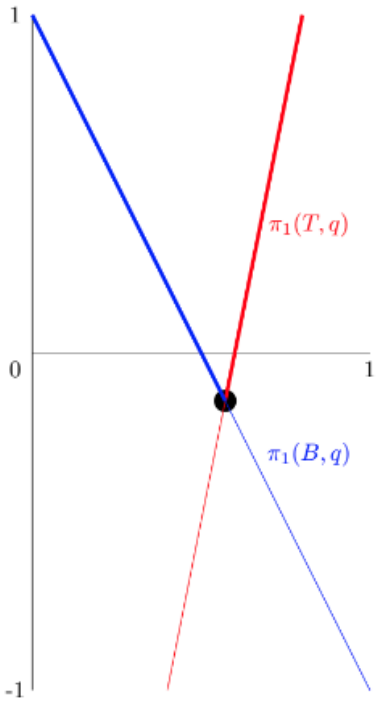

Figure 3

When $p = \frac{2}{7}$, player 2 is indifferent between their actions, if $p > \frac{2}{7}$, then player 2 always plays R and, similarly, when $p < \frac{2}{7}$, they always play L. By a symmetric argument, Player 1 is indifferent when $q = \frac{4}{7}$. Here 2/7 and 4/7 are the points at which the lines intersect. The value of the game is $-\frac{1}{7}$, and we also see that minmax = maxmin.