

## Problem Set 5

**Problem 1** (Subgame perfection). Exercise 10.6. (The four strategies in the bottom right corner of Figure 10.12 are missing labels; you can label them from left to right as  $v$ ,  $w$ ,  $v$ ,  $w$ .)

**Problem 2** (Distributor pricing). Exercise 10.10.

**Problem 3** (Bargaining with different discount factors). Exercise 11.5.

**Problem 4** (Dissolving a partnership). There are two players  $A$  and  $B$  who own a firm and are considering dissolving their partnership. Each owns half of the firm. The value of the whole firm is  $v_A$  for player  $A$  and  $v_B$  for player  $B$ , where  $v_A > v_B > 0$ . The players are risk neutral.

In each round of negotiation, the Proposer makes an offer  $(p, y) \in \mathbf{R}_+ \times \{B, S\}$ , where  $p$  indicates the price and  $y = B$  or  $y = S$  specifies whether the offer is to buy the Respondent's half of the firm or sell the Proposer's half of the firm (to the Respondent). If an agreement is not reached, each partner retains her half share in the firm.

The two partners make alternating proposals over an infinite horizon, but you do not have to solve this game! Simply represent this setting as a general bargaining problem by finding the *disagreement vector*  $x_d \in \mathbf{R}^2$  and the *feasible set*  $X \subseteq \mathbf{R}^2$ . (It is customary to include in the feasible set only outcomes that give each player at least her disagreement payoff.) Plot the set  $X$  and the point  $x_d$ .

Next, normalize the game so that the disagreement point is 0. In this normalized game, what is the new feasible set  $X'$ ? (Hint: Vectors in  $X'$  specify payoff differences relative to the disagreement point.)

MIT OpenCourseWare  
<https://ocw.mit.edu/>

14.12 Economic Applications of Game Theory  
Fall 2025

For information about citing these materials or our Terms of Use, visit: <https://ocw.mit.edu/terms>.