

**ECON 521, Discussion Section 11**

TA: *Shane Auerbach (sauerbach@wisc.edu)* ; Date: 11/14/14

1. Let's have another look at Question 12 from PS3:

	C	D
C	2,2	-1,3
D	3,-1	0,0

Consider an alternative to grim-trigger in which players play  $C$  so long as  $(C, C)$  was played in the previous period. If either player plays  $D$ , then both players play  $D$  for  $k$  subsequent periods, then revert to  $(C, C)$ . If a player plays  $C$  when they are supposed to play  $D$ , it resets the counter on the punishment phase to zero, that is they play  $k$  more periods of  $(D, D)$  before returning to  $(C, C)$ . If  $\delta = 0.35$ , what is the minimum  $k$  such that this is a SPE? In the solutions, in checking whether  $k = 1$  worked, I checked the following condition:

$$2 + 2\delta \geq 3 + 0\delta$$

Where did this condition come from, and what alternative (but equivalent) conditions could we come up with?

2. Consider a Stackelberg oligopoly with three firms, P1, P2 and P3. The market inverse demand is given by  $p = A - Q$  where  $Q = q_1 + q_2 + q_3$ . Assume  $A > \frac{19}{5}$ . P1 chooses  $q_1$  first. Then P2, having observed  $q_1$ , chooses  $q_2$ . Then P3, having observed  $q_1$  and  $q_2$ , chooses  $q_3$ . Each firm's costs of production are as follows:
- For P1:  $c(q_1) = 0$  (there are no production costs for P1)
  - For P2:  $c(q_2) = q_2^2$
  - For P3:  $c(q_3) = q_3 + F$  ( $F$  is a positive constant).
- (a) Find the SPE outcome quantities.
- (b) For some  $F$ , P3 is losing money in equilibrium. Why is this plausible?