Economics 611  Game Theoretic Microeconomics  Spring 2011
Second Exam

All Syracuse University policies and procedures concerning academic honesty apply to this course:

"Syracuse University students shall exhibit honesty in all academic endeavors. Cheating in any form is not tolerated, nor is assisting another person to cheat. The submission of any work by a student is taken as a guarantee that the thoughts and expressions in it are the student's own except when properly credited to another. Violations of this principle include: giving or receiving aid in an exam or where otherwise prohibited, fraud, plagiarism, the falsification or forgery of any record, or any other deceptive act in connection with academic work. **Plagiarism is the representation of another's words, ideas, programs, formulae, opinions, or other products of work as one's own either overtly or by failing to attribute them to their true source.**" (Section 1.0, University Rules and Regulations)

**WARNING!!!**

While homework problems may have been done cooperatively, **exams are individual work.** Do not communicate about this exam with anyone except the instructor [x3-2345 or e-mail to jskelly@maxwell.syr.edu]. **Violation of this rule will result in a grade of 0 for the exam.** Any notices will be sent to you by e-mail; check occasionally.

**EXPLAIN** your answers carefully.

*Keep a Xerox copy of your exam*

DUE: 9:30 am, Thursday, March 31, in class.
EXPLAIN your answers carefully. DUE: 9:30 am, Thursday, March 31, at the beginning of class. The four problems are each worth 25 points.

1. **(Signaling)** There are two worker types with \( \theta_H > \theta_L > 0 \), present in equal numbers. Education does not affect productivity and enters utility only through costs: \( U_i = w - C(e, \theta_i) \). Describe all equilibria in a signaling model for the case where

\[
\theta_L < r_L < E[\theta] < r_H < \theta_H.
\]

As part of your answer, what are the maximum and minimum amounts of education that might be chosen by H-type workers for different kinds of equilibria?

2. **(Signaling)** There are two types, H and L, high and low productivity. \( \theta_L = 1 \) and \( \theta_H = 2 \). For education level \( e \),

\[
U_i = e + w - C(e, \theta)
= e + w - \frac{e^2}{\theta_i}
\]

A fraction \( \lambda \) of the workers are L-type. Consider an equilibrium where half of the H-types and half of the L-types are separated and the rest of the workers are pooled.

**(A)** Determine - as a function of \( \lambda \) - the education levels \( e_L, e_p, \) and \( e_H \) chosen.

**(B)** Determine the signs of the derivatives of these levels with respect to \( \lambda \). Compare these derivatives by magnitude.
3. (Screening) There are two types, H and L, high and low productivity, present in equal numbers, with parameters $\theta_L = 1$ and $\theta_H = 3$. For wage $w$ and task level $t$,

\[
U_i = w - C(t, \theta_i) \\
= w - \frac{e^t - 1}{\theta_i}
\]

Productivity depends on task level: $P_i = \theta_i + \lfloor 2t \rfloor$. Determine all equilibria. Here $\lfloor x \rfloor$ is the floor function, giving the largest integer $\leq x$. Worry about pooling contracts that could break “equilibria,” but not about splitting contracts.

4. (Screening) There are two types, H and L, high and low productivity, present in equal numbers, with $\theta_L = 1$ and $\theta_H = 3$. For wage $w$ and task level $t$,

\[
U_i = w - C(t, \theta) \\
= w - \left( \frac{e^t - 1}{\theta} - 2\theta t \right)
\]

Determine all equilibria. Worry about pooling contracts that could break “equilibria,” but not about splitting contracts.