Homework 4

due 3/1/2011

Problem 1 In the signaling games in figures 7 and 8, compute all sequential equilibria and determine which of them satisfy the intuitive criterion.

Problem 2 In the signaling game in figure 9, find a sequential equilibrium in which message 2 is not played. Does this equilibrium satisfy the iterated intuitive criterion?

Problem 3 Consider infinite repetitions of the games in figures 1, 2, and 3. In each case, sketch the set of payoff vectors attainable in a subgame perfect equilibrium, and those which are attainable in a subgame perfect equilibrium using Nash reversion strategies. (Suppose that the discount rate is very close to one.)

		2	
		A	B
1	a	$2,2$	$1,0$
	b	$0,1$	$0,0$

Figure 1: Normal form game 1

		2	
		L	R
1	T	$3,0$	$1,-2$
	B	$5,4$	$-1,6$

Figure 2: Normal form game 2

		2	
		L	R
	T	$2,-2$	$4,1$
1	M	$1,3$	$0,0$
	B	$5,3$	$3,4$

Figure 3: Normal form game 3

Problem 4 Consider an infinite repetition of the normal form game in figure 4. For what values of δ can the play path $\{(C,C),(C,C),...\}$ be supported in a Nash equilibrium? What about in a subgame perfect equilibrium?

		2	
		C	D
1	C	$2,2$	$0,8$
	D	$8,0$	$1,1$

Figure 4: Normal form game 4

Problem 5 Consider an infinite repetition of the normal form game in figure 5.

a. Show that payoffs of $(4,4)$ can be supported in a subgame perfect equilibrium using a Nash reversion strategy if and only if $\delta \geq \frac{1}{2}$.

b. Show that for every $\delta \geq \frac{1}{4}$, there is a subgame perfect strategy profile yielding payoffs of $(4,4)$.

		2		
		a	b	c
	A	$1,2$	$5,1$	$1,0$
1	B	$2,1$	$4,4$	$0,0$
	C	$0,1$	$0,0$	$0,0$

Figure 5: Normal form game 5

Problem 6 Consider the normal form game G in figure 6 below.

a. Determine the set of Nash equilibria of the normal form game.

b. Let $G^\infty(\frac{3}{4})$ be an infinite repetition of G with common discount rate $\frac{3}{4}$. Sketch both the set of feasible payoffs of $G^\infty(\frac{3}{4})$ and the set of payoffs which are sustainable in some subgame perfect equilibrium of $G^\infty(\frac{3}{4})$.

		2		
		X	Y	Z
	A	$10,0$	$0,10$	$0,10$
	B	$9,1$	$1,9$	$1,9$
1	C	$2,8$	$8,2$	$1,9$
	D	$2,8$	$2,8$	$7,3$
	E	$4,6$	$5,5$	$6,4$

Figure 6: Normal form game 6

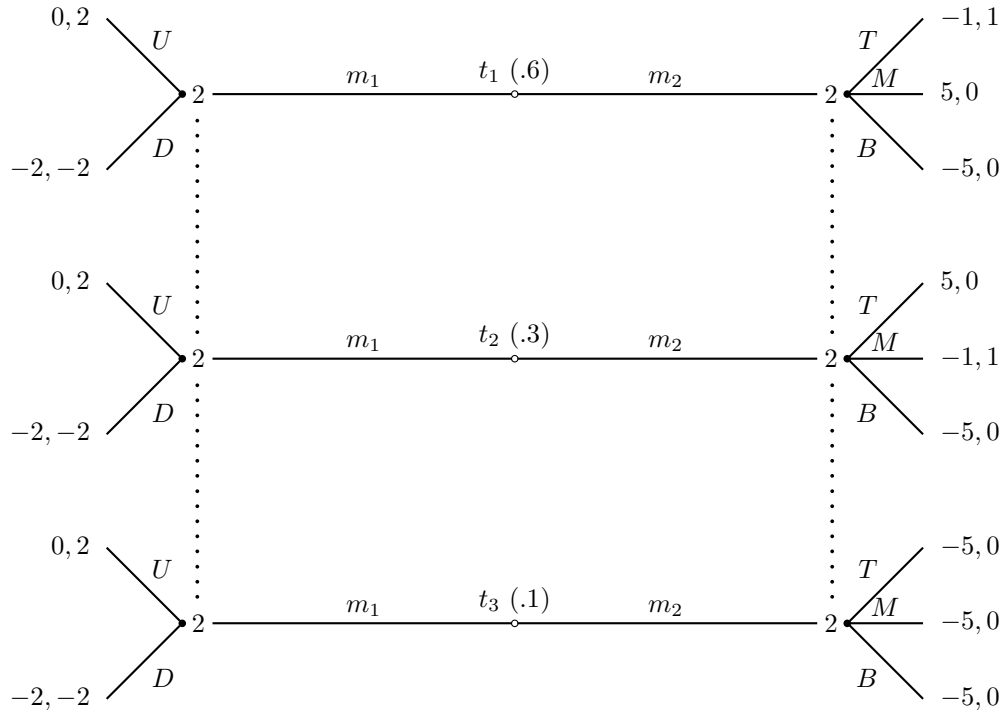

Figure 7: Signaling game 1

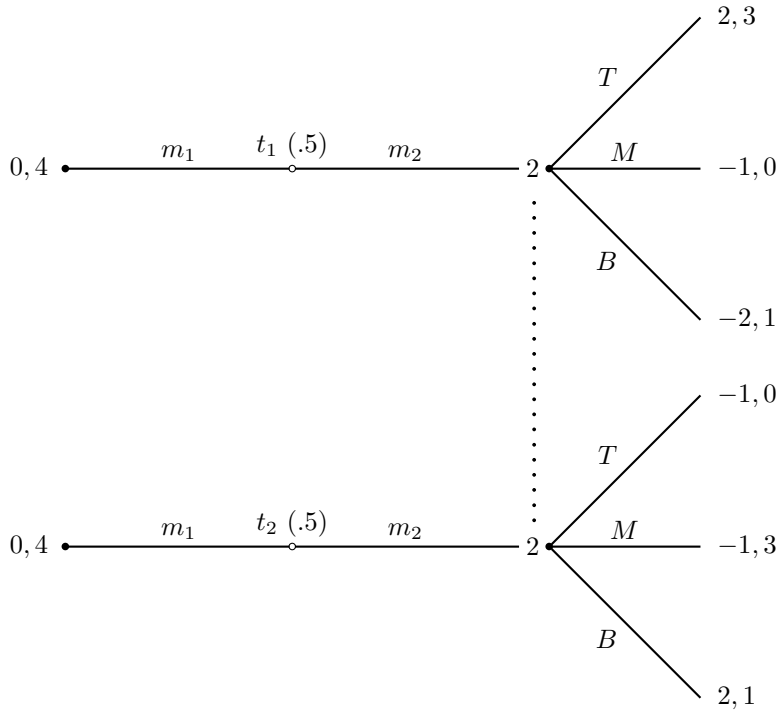

Figure 8: Signaling game 2.

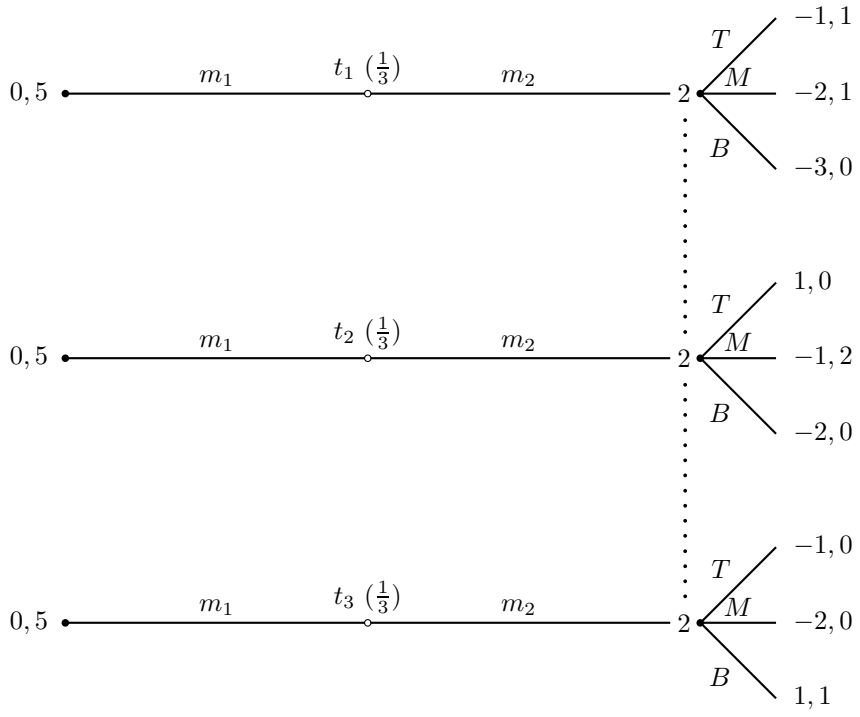

Figure 9: Signaling game 3