

IA168 — Problem set 3

For an extensive-form game G , let $SPE(G)$ denote the set of subgame-perfect equilibria of G .

Problem 1 [10 points]

Consider the following two-player strategic-form game G :

	X	Y
A	$(4, 4)$	$(-1, 5)$
B	$(5, -1)$	$(1, 1)$

- a) In dependence on the parameter $t \in \mathbb{N}^+$, calculate the number of strategy profiles in $G_{t\text{-rep}}$. Try to express the result as explicitly as possible.
- b) In $G_{\text{irep}}^{\text{avg}}$, find a subgame-perfect equilibrium whose outcome is $(3.2, 3.5)$.
- c) Calculate $\sup_{s \in SPE(G_{\text{irep}}^{\text{avg}})} u_1(s)$.
Justify your reasoning.

Problem 2 [10 points]

Let G be a two-player strategic-form game. Prove or disprove the following three propositions:

- a) if $0 < \delta < \delta' < 1$, then $SPE(G_{\text{irep}}^\delta) \supseteq SPE(G_{\text{irep}}^{\delta'})$;
- b) if $0 < \delta < \delta' < 1$, then $SPE(G_{\text{irep}}^\delta) \subseteq SPE(G_{\text{irep}}^{\delta'})$;
- c) $\sup_{s \in SPE(G_{\text{irep}}^\delta)} u_1(s) + u_2(s)$ is a continuous function of $\delta \in (0; 1)$ (here u_1 and u_2 correspond to the given δ);