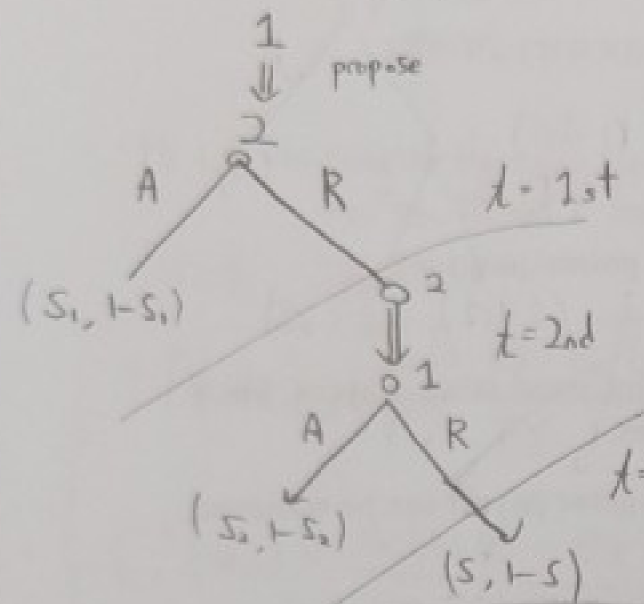
본 교재의 순차협상부분을 참고해보고.

discount factor를 어떻게 적용시킬까.

Assume that each player will accept an offer if indifferent between accepting and rejecting. The discount factor is δ, where $0 < \delta < 1$. Then, find a Nash equilibrium through using backward induction. (10 points)

Game is like this graph



by backward induction, let's see 2nd period. and we know player 1 compare his payoff S_2 and S and S's present value in 2nd is $\delta \times S$, and player 1's best response in 2nd period is like this,

player 1 action $\begin{cases} A, & S_2 \geq \delta \cdot S \\ R, & S_2 < \delta \cdot S \end{cases}$ (if both are same, we chose A)

And then, for player 2, she knows that when player 2 chose A, she can maximize her payoff by suggesting $S_2 = \delta \times S$.

Then, let's check it is better than payoff that she would got when player 1 reject. And that payoff is $1-S$, and it's present value is $\delta \times (1-S)$.

$1-\delta S$ (player 1 accept in $S_2 = \delta \times S$) $\geq \delta(1-S)$, so player 1's suggestion $S_2 = \delta \times S$ is best response.

Then, let's see 1st period. player 2 got $1-S_1$ when chose A, otherwise $1-\delta S$. And player 2's best response in 1st period is like this, present value

player 2 $\begin{cases} A, (1-S_1) \geq \delta(1-\delta S) \rightarrow S_1 \leq 1-\delta(1-\delta S) \\ R, (1-S_1) < \delta(1-\delta S) \rightarrow S_1 > 1-\delta(1-\delta S) \end{cases}$

then player want to make player 2 accept his propose and maximize his payoff, $S_1 = 1-\delta(1-\delta S)$ may be satisfied. Then he compare this results with player 2's reject. then he get $\delta \cdot S$.

$1-\delta(1-\delta S) > \delta S$, so he suppose $\boxed{S_1 = 1-\delta(1-\delta S)}$

So, nash equilibrium is just like this,

player 1	player 2
1st : $S_1 = 1-\delta(1-\delta S)$	1st $\begin{cases} A, S_1 \leq 1-\delta(1-\delta S) \\ R, S_1 > 1-\delta(1-\delta S) \end{cases}$
2nd $\begin{cases} A, S_2 \geq \delta \cdot S \\ R, S_2 < \delta \cdot S \end{cases}$	2nd $S_2 = \delta S$

7. Everyone gives lip service to the fact that saving is a good idea. Unfortunately, few people actually do it. Part of the reason for the reluctance to save is that individuals recognize that society won't let them starve, so there is a good chance they will be bailed out later on. To formulate this in a game between the generations, let's consider two strategies for the older generation: save or squander. The younger generation likewise has two strategies: support their elders or save for their own retirement. A possible game matrix is shown below.

Old \ Young	*Support*	*Refrain*
Save	2, -1	1, 0
Squander	3, -1	-2, -2

(a) Find pure strategy Nash equilibria. (4 points)

(squander, support), (save, refrain)