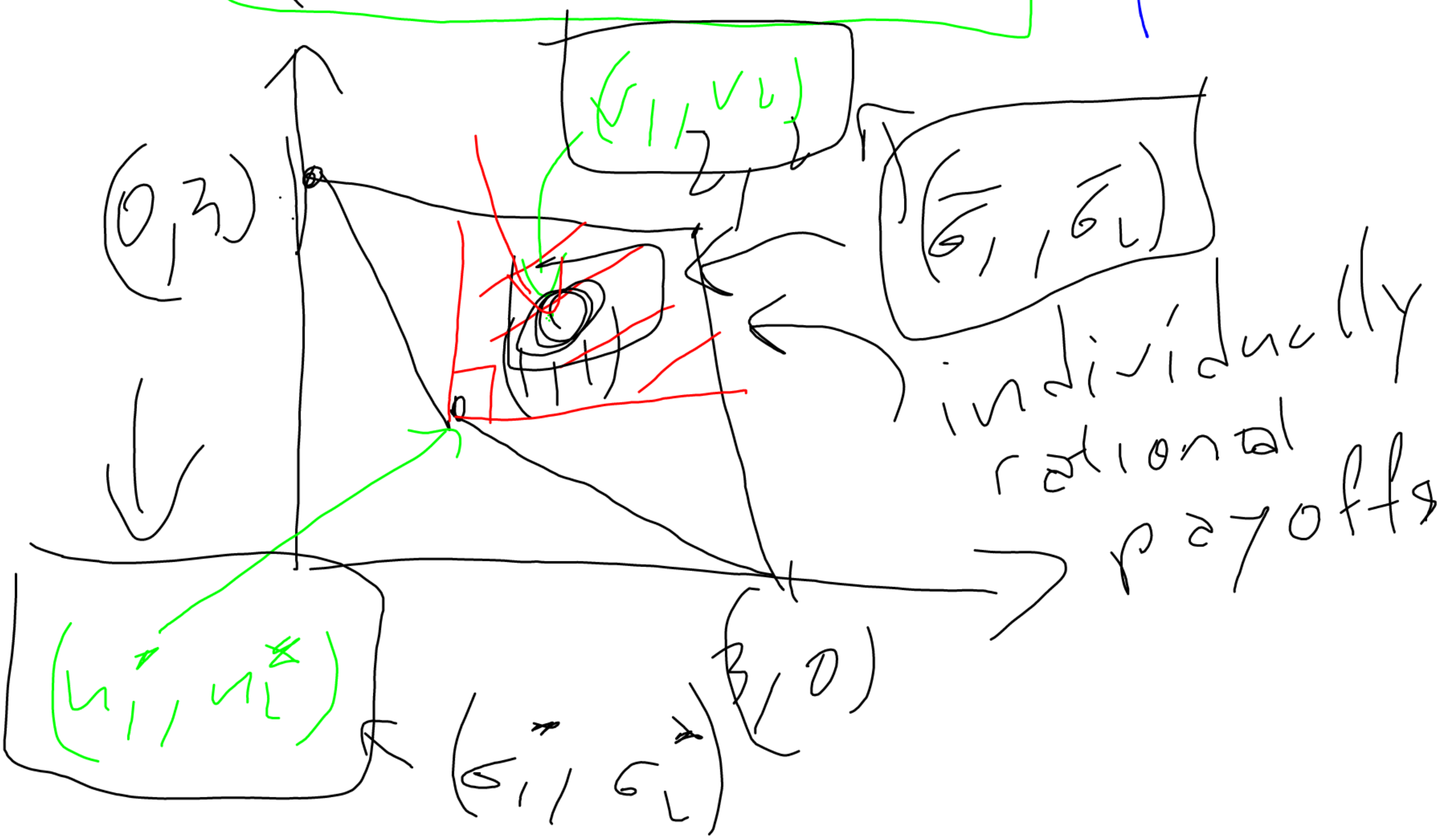
2,2	0,3
3,0	1,1

$\delta \leftarrow$ prob. of game continuing

$T = \frac{1}{1-\delta}$ length of game

$(1-\delta) u_i(r, s)$ mean payoff per stage



$\exists\ \bar{\delta}$ s.t. $\forall\ 1 > \delta \geq \bar{\delta} > 0$

$\exists$ a s.p.N.E $\rightsquigarrow (v_1, v_2)$

"Begin by playing $\bar{\sigma}_i$ . . .
if any player deviates use
σ_i^* $\forall$ future stages"

$\boxed{\text{Deviation?}}$

P_1 deviates at stage k:

$$u_1^{(k)} = \sum_{t=1}^{k-1} \delta^{t-1} v_1 + \delta^{k-1} \overbrace{u_1(\sigma_1', \bar{\sigma}_2)}^{v_1} + u_1^* \left(\frac{1}{1-\delta} - \sum_{t=1}^{k} \delta^{t-1} \right)$$

Deviate in 1^{st} stage makes most sense.

$(k=1)$

$$u_1^{(1)} = u_1(\sigma_1', \bar{\sigma}_2) + u_1^* \boxed{\frac{\delta}{1-\delta}}$$

if then

$$\overbrace{u_1(\sigma_1', \bar{\sigma}_1) + u_1^* \frac{\delta}{1-\delta} < \frac{v_1}{1-\delta}}^{NE}$$

?   ?

$$(1-\delta)u_1(\sigma_1', \bar{\sigma}_2) + u_1^*\delta < v_1$$

$$u_1(\sigma_1', \bar{\sigma}_2) - v_1 < \delta\,\underbrace{(\overline{u_1(\sigma_1, \bar{\sigma}_2)} - u_1^*)}_{\geq 0}$$

$\geq$ ✓

NE as long as $\delta \geq \bar{\delta}$

where

$$0 < \bar{\delta} = \frac{u_1(\sigma_1', \bar{\sigma}_2) - v_1}{u_1(\sigma_1, \bar{\sigma}_2) - u_1^*} < 1$$

NE ✓

<u>subgame perfection?</u>

$$\delta \rightsquigarrow \delta^k$$