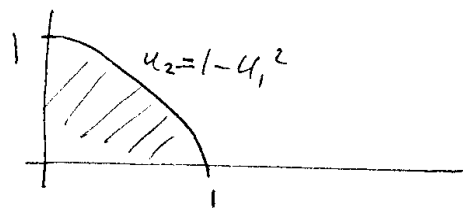


④ In utility space $1 \geq u_1 + u_2 \geq u_1^2 + u_2^2$ $u_1 \geq 0, u_2 \geq 0$



(a) Nash $g(u_1, u_2) = u_1 u_2 =$

On boundary curve $g = u_1(1 - u_1^2) = u_1 - u_1^3$.

$$\frac{dg}{du_1} = 1 - 3u_1^2 = 0 \quad u_1^2 = \frac{1}{3} \quad u_1 = \frac{1}{\sqrt{3}}$$

$$u_2 = \frac{1}{\sqrt{3}}$$

$$u_2 = u_1 = 1 - u_1^2 = 1 - \frac{1}{3} = \frac{2}{3}$$

Values $u_1 = \frac{1}{\sqrt{3}}, u_2 = \frac{2}{3}, u_1 = \frac{1}{\sqrt{3}}, u_2 = \frac{2}{3}$

(b) $k = 1 = \frac{1-0}{1-0}$

Look along line $u_2 = u_1$

Hits $1 = u_1^2 + u_2^2$, $1 = u_1^2 + u_1^2$, $0 = u_1^2 + u_1 - 1$. (10)

$$u_1 = \frac{-1 \pm \sqrt{1+4}}{2} = \frac{-1 \pm \sqrt{5}}{2} \quad \text{so} \quad \frac{-1 + \sqrt{5}}{2} = u_1^*$$

$$u_2^* = u_1^* = 1 - u_1^{*2} = 1 - \left(\frac{-1 + \sqrt{5}}{2}\right)^2$$

$$u_1^* = (u_1^*)^2 = \left(\frac{\sqrt{5}-1}{2}\right)^2$$

⑤ $E(H) = 0.75(200) + 0.25(0) = 150$

$$E(J) = 0.75(160) + 0.25(40) = 130$$

at C choose H over I, $150 > 100$. $E(C) = 150$

$$E(A) = 0.6(150) + 0.4(50) = 90 + 20 = 110$$

at F choose J over K, $130 > 100$. $E(F) = 130$

$$E(B) = 0.6(130) + 0.4(100) = 78 + 40 = 118$$

$118 > 110$ so choose B over A.

Expected payoff 118.

Strategy. Choose B over A, J over K, H over I.