$$\max_{X} \; u(\cancel{10}-X, X) \qquad\qquad \max_{X} \; u(5-x, x)$$

FOC: $u_1(\cancel{10}-x, x)(-1) + u_2(\cancel{10}-x, x) = 0$

$$\frac{u_1(e-x, x)}{u_2(e-x, x)} = 1 \qquad e = 5 \text{ or } 10$$

$$X_1^* = x : \frac{u_1(e_1-x, x)}{u_2(e_1-x, x)} = 1 \qquad x_2^* = x : \frac{u_1(e_2-x, x)}{u_2(e_2-x, x)} = 1$$

$$\max_{x} \; p\, u(e_1-x, x) + (1-p)\, u(e_2-x, x)$$

$$p\left[u_1(e_1-x, x)(-1) + u_2(e_1-x, x)\right] + (1-p)\left(u_1(e_2-x, x)(-1) + u_2(e_2-x, x)\right) = 0$$

$$p u_1(e_1-x, x) + (1-p) u_1(e_2-x, x) = p u_2(e_1-x, x) + (1-p) u_2(e_2-x, x)$$

ask $\quad e_1 \rightarrow e_2$

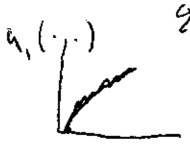
$$\max_{x \in [0, e_1]} f(x, p) \qquad f(x, p) = p u(e_1-x, x) + (1-p) u(e_2-x, x)$$

lattice ✓   increasing diffs ✓

$$\frac{\partial f}{\partial p} = u(e_1-x, x) - u(e_2-x, x)$$

f sup on x ✓

true x 1-D

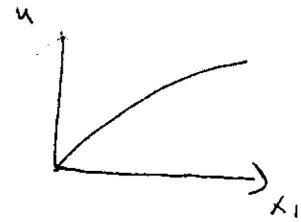


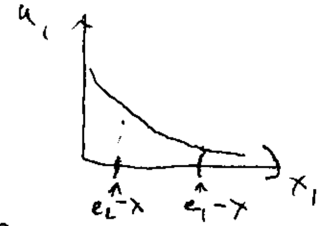
$$\frac{\partial^2 f}{\partial p \, \partial x} = -u_1(e_1-x, x) + u_2(e_1-x, x) + u_1(e_2-x, x) - u_2(e_2-x, x)$$

$$= u_1(e_2-x, x) - u_1(e_1-x, x) + u_2(e_1-x, x) - u_2(e_2-x, x)$$

$u_1(e_2 - x, x) \geq u_1(e_1 - x, x)$ if $u_{11} < 0$

$u_2(e_1 - x, x) \geq u_2(e_2 - x, x)$ or $u_{22} < 0$



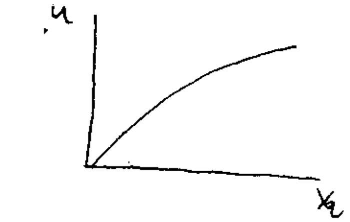


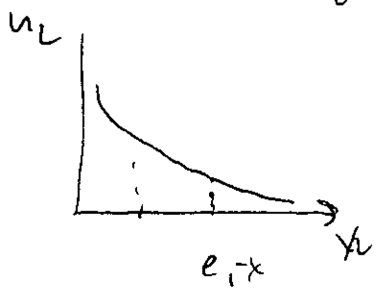
$\therefore \dfrac{\partial^2 f}{\partial p\, \partial x} \geq 0$

$\therefore x^*(p)$ increasing in p

In particular, $x^*(0)$: $\$\sigma$ for certain
$x^*(p)$ for $p \in (0,1)$
$x^*(1)$: $\$\omega$ for certain

statement abt cross derivs





$(0, 0, 10) \sim (X(10), 0, 0)$

$\Downarrow ?$

$(0, x, 10) \sim (X(10), x, 0) \quad \forall x ?$

$\Downarrow ?$

also

$(0, x, 10 - x) \sim (X(10) - x, x, 0)$

1a: $x^*_{1a} = \arg\max_{x \in [0,5]} \boxed{u(0, x, 10 - x)}$

1b: $x^*_{1b} = \arg\max_{x \in [0, X(5)]} \boxed{u(X(10) - x, x, 0)}$

2a: $X^*_{2a}(p) = \arg\max_{x \in [0,5]} \; p\, \boxed{u(0, \cancel{10-x}\, x, 10-x)} + (1-p)\, u(0, x, 5-x)$

2b: $X^*_{2b}(p) = \arg\max_{x \in [0, X(5)]} \; p\, \boxed{u(X(10) - x, x, 0)} + (1-p)\, u(X(10) - x, x, 0)$

---

normalization: Self ⟺ C2

$(0,0,5) \sim (X_2(5), 0, 0)$

$\vdots$

$(0,0,10) \sim (X_2(10), 0, 0)$

normalization self ⟺ C1

~~normalization donation~~

$(0, 5, 0) \sim (X_1(5), 0, 0)$

$\vdots$

$(0, 10, 0) \sim (X_2(10), 0, 0)$

~~~~ C1

~~donation~~ 1a:

(1a): C1 ⟺ C2

~~~~

certainty

$(0, 5, 0) \sim (0, 0, Y(5))$

$\vdots$

$(0, 10, 0) \sim (0, 0, Y(10))$

(1b): C1 ⟺ Self

~~Self~~

certainty

$(0, 5, 0) \sim (X(5), 0, 0)$

$\vdots$

$(0, 10, 0) \sim (X(10), 0, 0)$

(4a): ~~C1 ⟺ C2 risk~~

C1 ⟺ self

risk

~~~~

C1 risk: $(0, 4, 0) \sim q\,(0, 5, 0) + (1-q)\,(0, 10, 0)$
~~~~

Alt Task

$(0,$ [illegible] $,0) \sim q(0,0,Y(10)) + (1-q)(0,0,Y(5))$

for $q \in (\ldots)$