3.1 UTILITY FUNCTION

USUALLY 1 EURO IS WORTH ALMOST NOTHING, BUT IN ANY CASE BETTER THAN 0 EURO.

UTILITY (0) = 0 UTILITY (1) = 0,001

10 EURO ARE USUALLY PERCEIVED AS THEIR RIGHT VALUE

UTILITY (10) = 10

100 EURO ARE CONSIDERED A NICE AMOUNT, 1000 EVEN BETTER

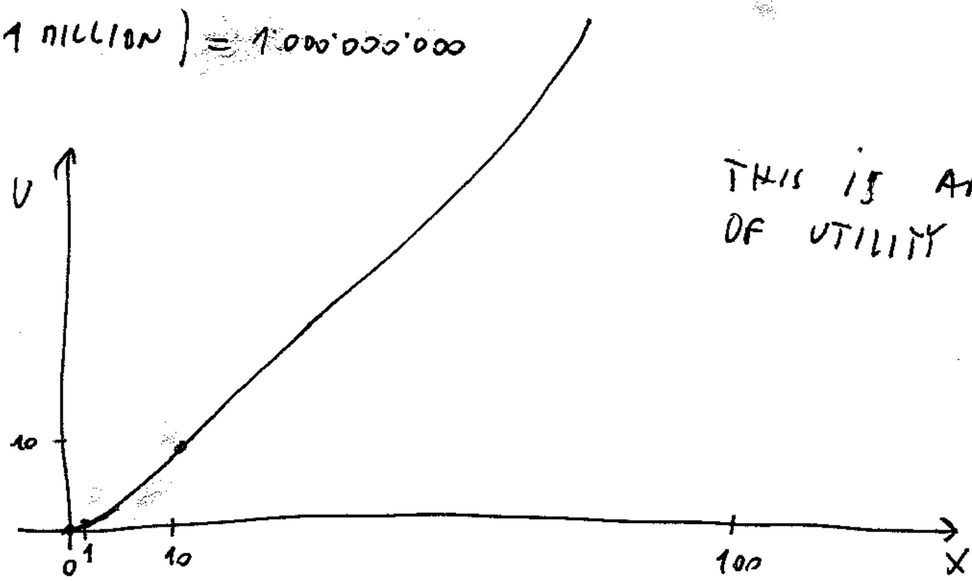
UTILITY (100) = 120 UTILITY (1000) = 2500

10'000 EURO ARE WONDERFUL, AND 100'000 CAN SLIGHTLY CHANGE YOUR LIFESTYLE

U (10'000) = 30000 U (100 000) = 10'000'000

ONE MILLION EURO CAN RADICALLY CHANGE YOUR LIFE

U (1 MILLION) = 1'000'000'000



THIS IS AN EXAMPLE OF UTILITY FUNCTION

UTILITY FUNCTION HAS ONLY TWO REQUISITES

1) $U(0) = 0$ (THIS REQUISITE IS OFTEN NOT CONSIDERED)

2) U IS STRICTLY INCREASING

3.2 ANOTHER EXAMPLE

1 MILLION CAN CHANGE YOUR LIFE $U(1'000'000) = 1'000'000'000$

BUT 2 MILLIONS WILL NOT IMPROVE YOUR LIFE MUCH MORE

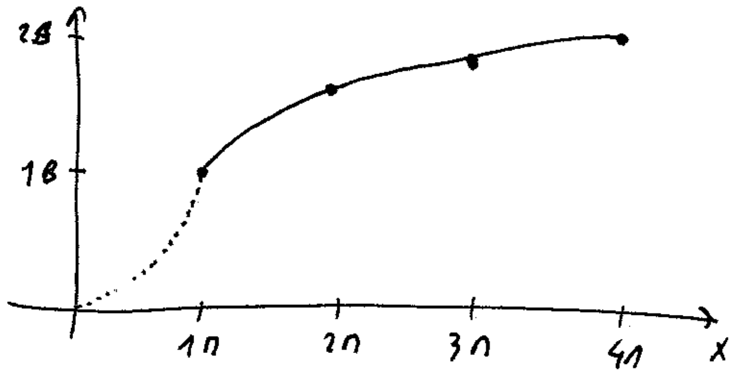
$U(2'000'000) = 1'500'000'000$

3 MILLIONS ARE BETTER, BUT NOT SO MUCH

$U(3'000'000) = 1'700'000'000$

4 MILLIONS DO NOT MAKE ANY CHANGE

$U(4'000'000) = 1'800'000'000$



UTILITY FUNCTION, WHICH MUST BE INCREASING, CAN THEREFORE BE CONVEX OR CONCAVE (OR STRAIGHT)

USING THE UTILITY FUNCTION, WE CAN EVALUATE THE EXPECTED UTILITY OF A LOTTERY

$$E(U(L)) = U(L) = \sum_{i=1}^{s} U(x_i) \cdot p_i$$

- SUM OF 2 DICE ROLLS WITH $U(x) = e^x - 1$

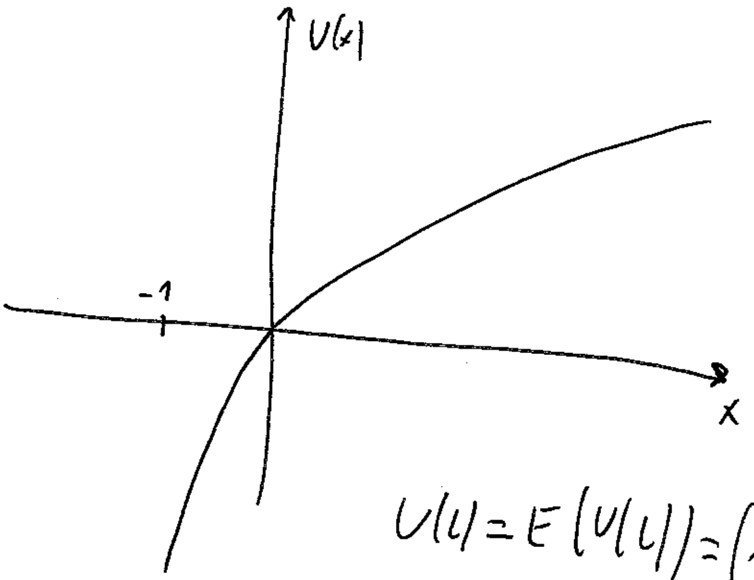
$$E(U(L)) = U(L) = (e^{-1}-1)\cdot\frac{2}{3} + (e^{0}-1)\cdot\frac{1}{6} + (e^{4}-1)\cdot\frac{1}{6} \approx -0{,}64\cdot\frac{2}{3} + 0 + 53\cdot\frac{1}{6} =$$

$$\approx 8{,}41$$

IF SOMEBODY HAS UTILITY $e^x - 1$ $\Rightarrow$ SUM OF 2 DICE BECOMES CONVENIENT

3.3

WE NOW CONSIDER $U(x) = \ln(x+e) - 1$



$L = (-1, 2/3 ; 0, 1/6 ; +4, 1/6)$

$$U(L) = E(U(L)) = (\ln(-1+e)-1)\cdot\frac{2}{3} + (\ln(0+e)-1)\cdot\frac{1}{6} +$$

$$+ (\ln(4+e)-1)\cdot\frac{1}{6} = -0{,}46\cdot\frac{2}{3} + 0\cdot\frac{1}{6} + 0{,}9\cdot\frac{1}{6} =$$

$$= -0{,}16$$

$$U(E(L)) = U\left(-1\cdot\frac{2}{3} + 0\cdot\frac{1}{6} + 4\cdot\frac{1}{6}\right) = U(0) = (\ln(0+e)-1) = 0$$

LOTTERY FOR THIS USER IS NOT CONVENIENT SINCE $U(L) = -0{,}16$

IN GENERAL WE WILL PROVE THAT CONCAVE FUNCTIONS BELONG TO RISK-AVERSE AGENTS AND CONVEX FUNCTIONS TO RISK-LOVER AGENTS