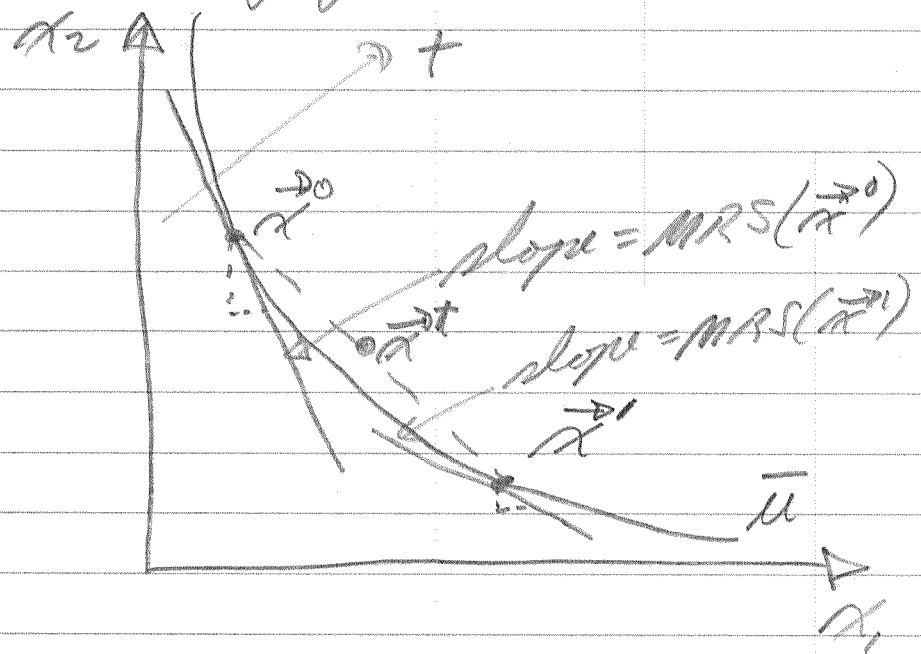


#1 The marginal rate of substitution  
It is "strict convexity" of preferences  
that implies a diminishing MRS.

The MRS corresponds to the  
slope of an indifference curve  
for two goods, say goods 1 and 2.

Strictly convex  
preferences.

+ increasing  
to north-east.



The MRS tells us how many units  
of good 2 one is willing to give up  
in exchange for one more unit  
of good 1, while keeping welfare  
constant.

From the figure, we see that  
 $MRS(x^1) < MRS(x^0)$ , i.e., the  
consumer is willing to give up  
more units of good 2 at  $x^0$  than at  $x^1$ .

It is in this sense that we say that the MRS is diminishing.

The MRS is diminishing because the indifference curve is convex to the origin, as drawn. This corresponds to convex preferences as it implies that

$$\vec{x}^t \succ \vec{x}^0 \text{ where } \vec{x}^t = t\vec{x}^0 + (1-t)\vec{x}^1 \text{ and } \vec{x}^1 \sim \vec{x}^0.$$

Counter-example? Assume preferences are not convex. Then increasing MRS ...