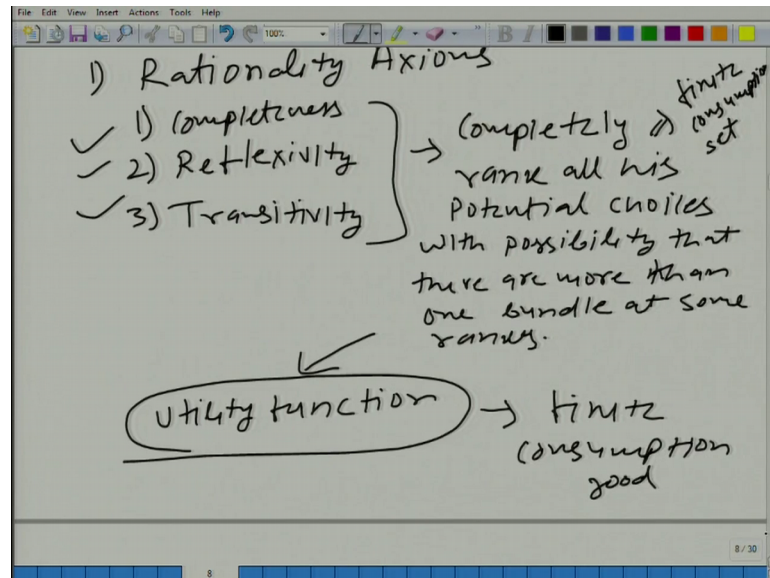


**An Introduction to Microeconomics**  
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**Lecture – 53**  
**Summary**

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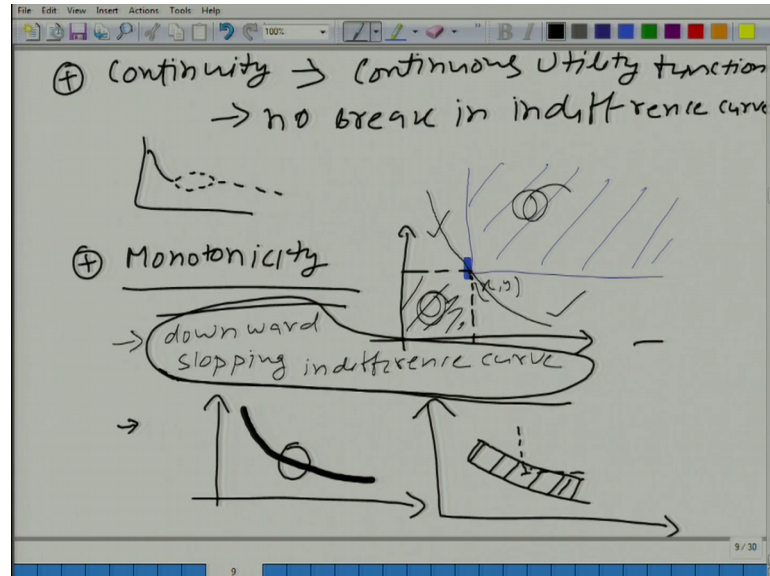
So, we will come back to these the uses of these assumptions and these axioms, but before that I just want to summarize that what we have learned through these axioms through these properties.

So, the first we learned rationality, rationality axioms - completeness, reflexivity and transitivity. These three we have learned. And when our when someone's preference exhibit these three property what does it mean that he is able to completely rank all his choices all his potential choices, with also possibility with possibility that there are more than one bundle at some ranks this is a possibility.

One thing also I should add that that he will be able to rank only if he has finite consumption set and also what we have learned that this will translate into a utility function. So, if these 3 axioms are satisfied you will get one utility function. In case of finite consumption good, fine.

Next we add I am not saying just continuity implies this, but continuity in addition to earlier three axioms that we have learned, continuity.

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And what do we get? What we get is continuous utility function and now we do not have to impose the restriction that our consumption set is the consumption set of this individual is finite. What else, what does it mean continuity? No, break indifference curve, can I say that, no break in the indifference curve would be continuous.

What it means is let us see that we cannot have we cannot this kind of indifference curve and also using all 4 above what we have learned earlier in the class that that indifference curve of an individual cannot intersect two indifference curve of a particular individual would not intersect. That is also we will get got from continuity, fine.

Now, let us add nonsatiation, but let us take example of your monotonicity, monotonicity, and what would it imply? In other word let us say that is clear that, that is through definition, but it if we translate it into on indifference map what we will get that the indifference curve has to be a downward sloping curve. Why? Because when we take here say a point we are talking, all the bundles here are, all the bundles here are let us say here is the bundle that we are talking about  $x$  comma  $y$  all the bundles in this blue zone are preferred over  $x$   $y$  and here they would be least preferred.

So, if we combine we bring continuity there will be a bundle in its nearby zone which a person would be indifferent between that bundle and  $x$   $y$  bundle. So, it cannot in this zone, it cannot be in this zone, where will you find that bundle? Either in this zone or in this zone.

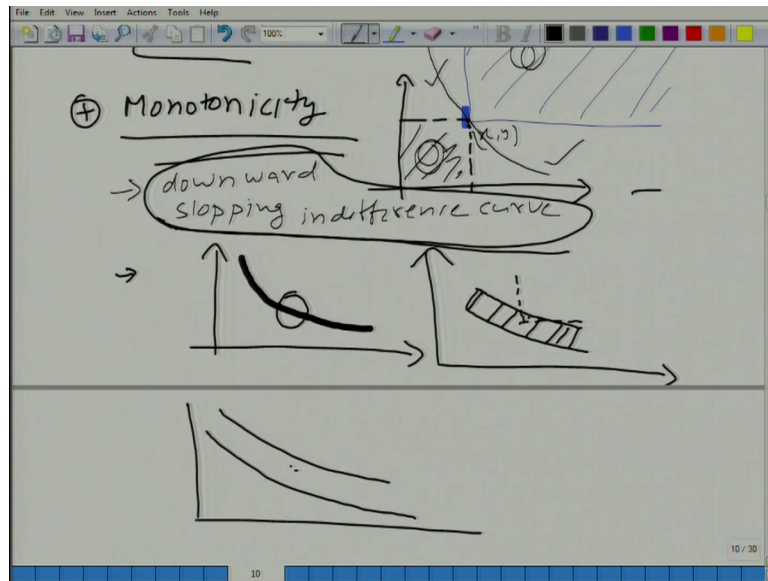
So, if you keep on continuing how you will get the indifference curve? So indifference curve has to be downwards sloping, fine. So, from here we learned that indifference curve has to be downward sloping. What else? Anything else the monotonicity would tell us?

Student: (Refer Time: 05:52).

Of course, so that is clear from here the downward sloping indifference curve because whenever you have downward sloping indifference curve  $mrs$  will be negative that is clear, that is clear. The other thing that we can get from monotonicity is that indifference curve cannot be a thick curve. For example, we cannot have let me draw really the thickest possible it cannot be like this. Why? If I do this let me take this zone and look at it in, at the bigger scale what will happen, what we are basically seeing is that indifference curve is like this.

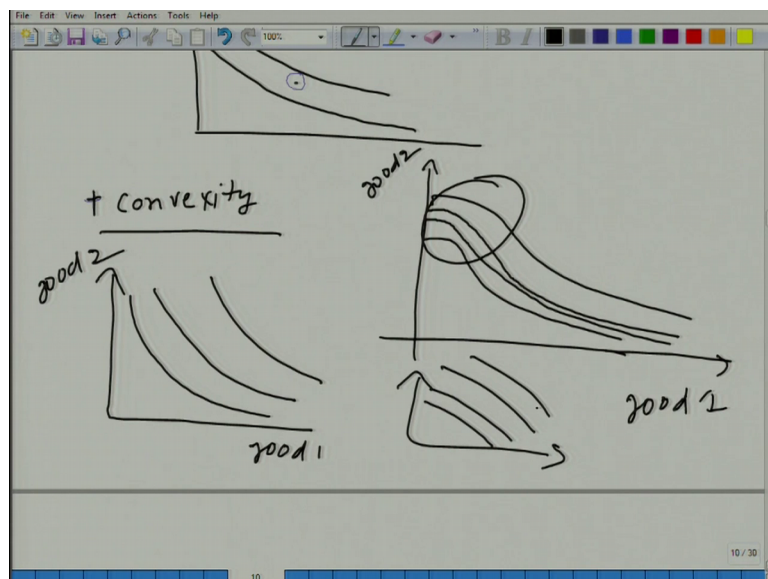
So, monotonicity will be violated because if you take a bundle here then here you have a bundle which has more of both the goods, but still you are indifferent between the original bundle and this bundle that can that is not possible. In fact, thickness what we talked about thickness, see downward sloping curve you will not get from local nonsatiation, but local nonsatiation will very clearly give you thin indifference curve because the same you can take the same logic here.

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Let us say here and you have really thick indifference curve like this and here is a bundle that we have taken and we take small neighborhood around this ok. So, you are not able to find a bundle which is preferred over the original bundle. Why? Because the indifference curve is a thick one. So, even local nonsatiation would say that indifference curve has to be a very thin, fine, it is clear.

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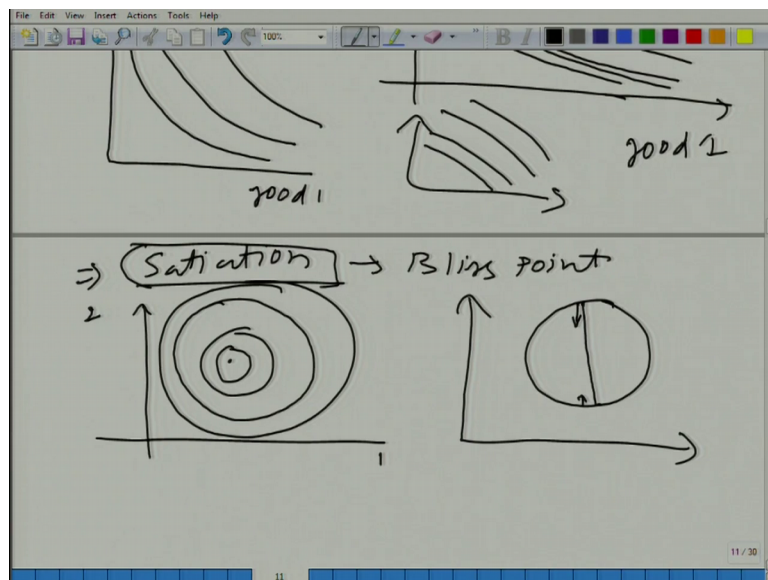


And now we have convexity plus convexity. Let me say that forget about fulfilling the requirement imposed by convexity axiom. Let us say a person preference satisfies all the

other axioms, and I draw let us say this is this is his indifference curve is there anything wrong with this indifference curve what is wrong. I am not talking about convexity I am not; nothing wrong everything is satisfied. Of course, what I mean here is of course I am not drawing the family of indifference curve, but what I mean this person's indifference curve is like this, fine.

So, everything is satisfied, but convexity is not satisfied, where? In this zone, in this zone. So, whenever we have convexity the indifference curve would be will look like this. Can I say it is bowed out? As opposed to this what you here if convexity is not satisfied you get something like this. We covered all these axioms let us look at one more case because we discussed.

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When we have satiation or in other word when we have bliss points. How would the indifference curve look like? Concentric circle around like this why I am talking about it good 2 and good 1. Now tell me is it convex in this case preference of course, this is not the zone it is just poor drawing is it convex or it is not convex. Ajit, is it convex or it is not convex? Devesh?

Student: It is a partial.

Partial, I did not define anything partial in the class. It is convex, let us look at it, let us look at it. Let us take one indifference curve. Let us take one indifference curve, let us

pick any two bundle on this indifference curve. All the bundles here are preferred over the original two bundles, why because here at this point utility is increasing in this direction and at this points utility increasing in this direction. So, it is convex. Convexity is satisfied, continuity is satisfied, rationality axioms are satisfied, what is not satisfied here is monotonicity or local nonsatiation is satisfied everywhere except at this bliss point, is it clear.

So, now, what we will do we will start talking about mathematical problems, optimization and all.