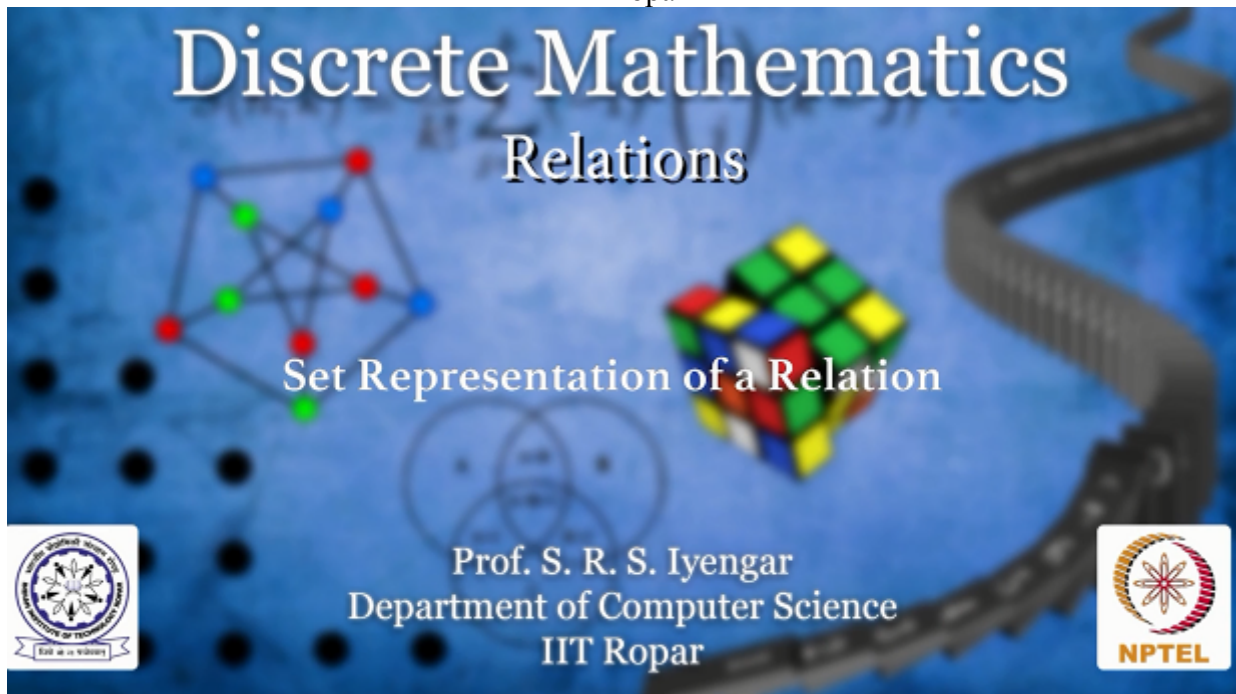


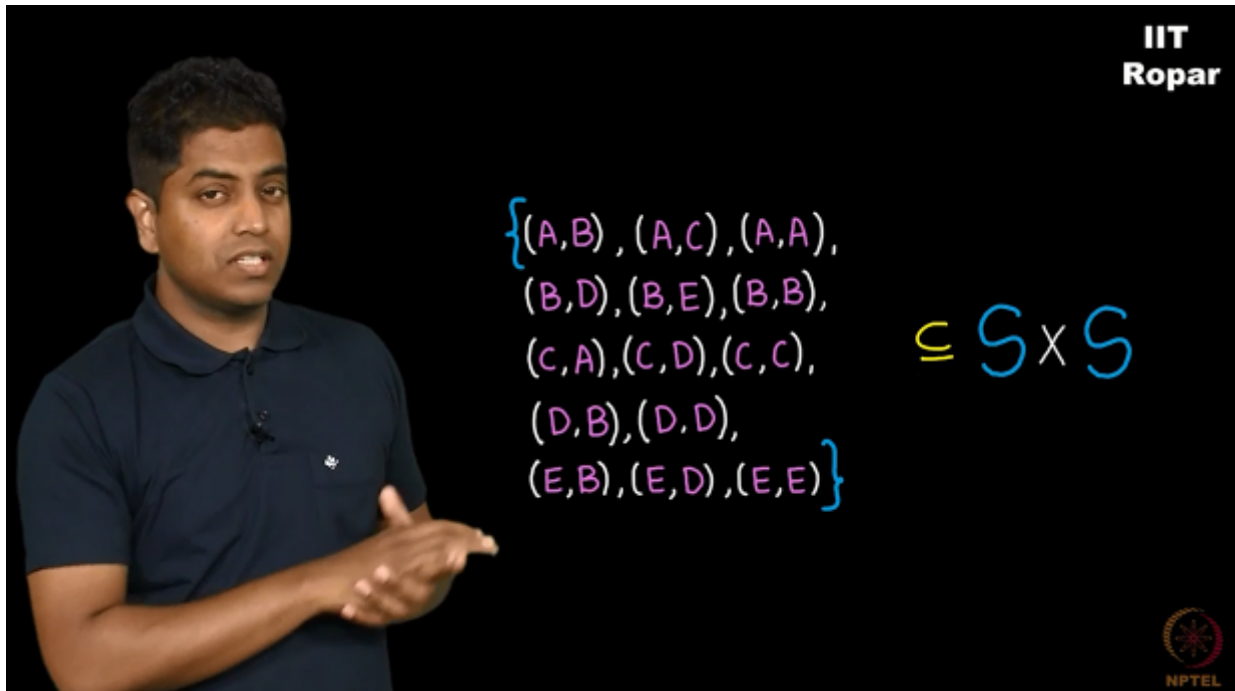
NPTEL
NPTEL ONLINE COURSE
Discrete Mathematics
Relations
Cartesian Product
With
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See, life is all about problems, but then one of the tips that counselors give is try seeing the problem differently. Every time we see the problem in a different angle, it appears different to us, and probably, one such angle of seeing the problem might help us understand the problem better. This is very true in math as well.

Generally, you will observe that the same thing is seen in different possible ways. If you have taken a course in any topic in mathematics, you will observe that people will say, oh, this is the way you define something, geometrically this means this, right. It helps to see what one means by, let's say, differentiation or integration geometrically, if you know what one means by differentiation or integration.

So we spoke about relations. I told you one way of seeing what a relation is would be by, let's say, arrows, A, B, C, D, E example, remember, this was the example. We represented the relation by arrows. Another way was via matrix, this way, correct.



There is a third way and actually the most important way in this chapter, that is using simply sets. We represent a relation in the form of a set. How do we do that? Observe.

This very example of A, B, C, D, E people instead of writing A knows B, I simply write down within small brackets (A,B) and so on and so forth, I write down all possible relations like this, and put that within a set. You see what's happening here. This is part of your $A \times A$ set that I spoke about, rather $S \times S$ in this case, because the set is S here, correct. This is a subset of $S \times S$. So you see, we observed something.

Any relation is actually a subset of your $S \times S$, correct. Take any subset of $S \times S$, that will be a relation; take any relation, it is a subset of $S \times S$, very straightforward an idea, but it requires some observation from our part to realize what's happening.

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