NPTEL
NPTEL ONLINE COURSE

Discrete Mathematics
Functions

Number of Onto functions

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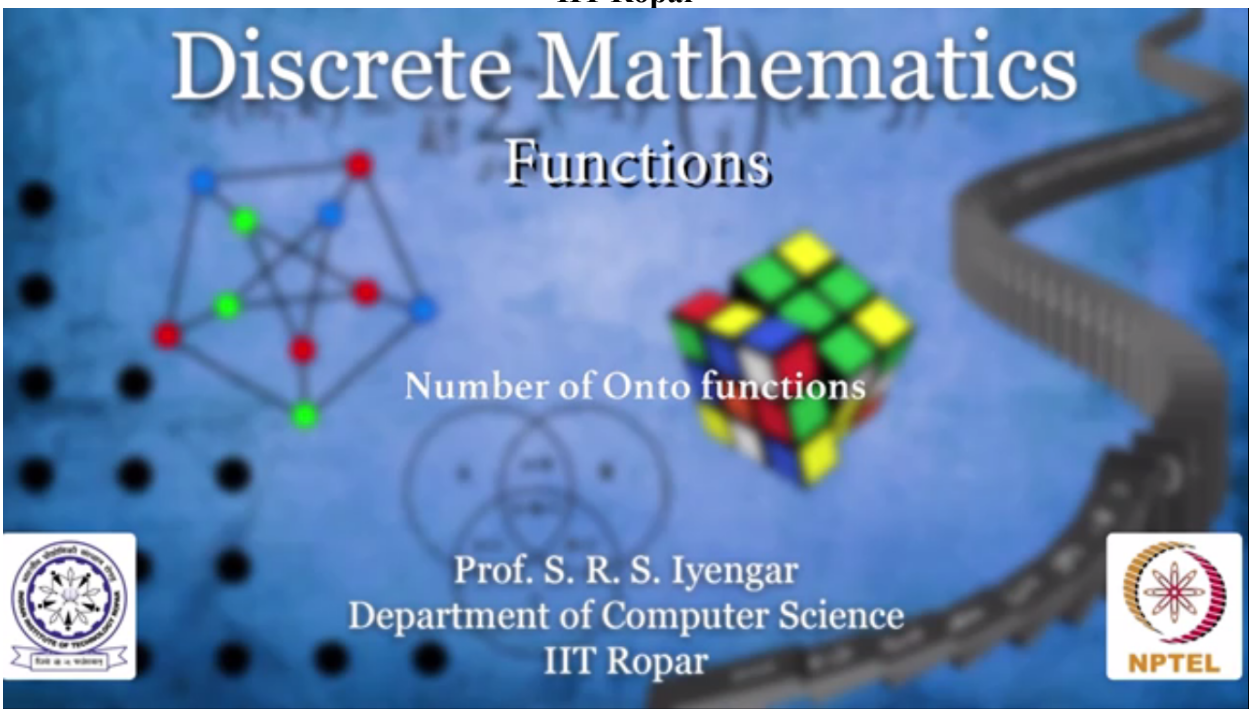
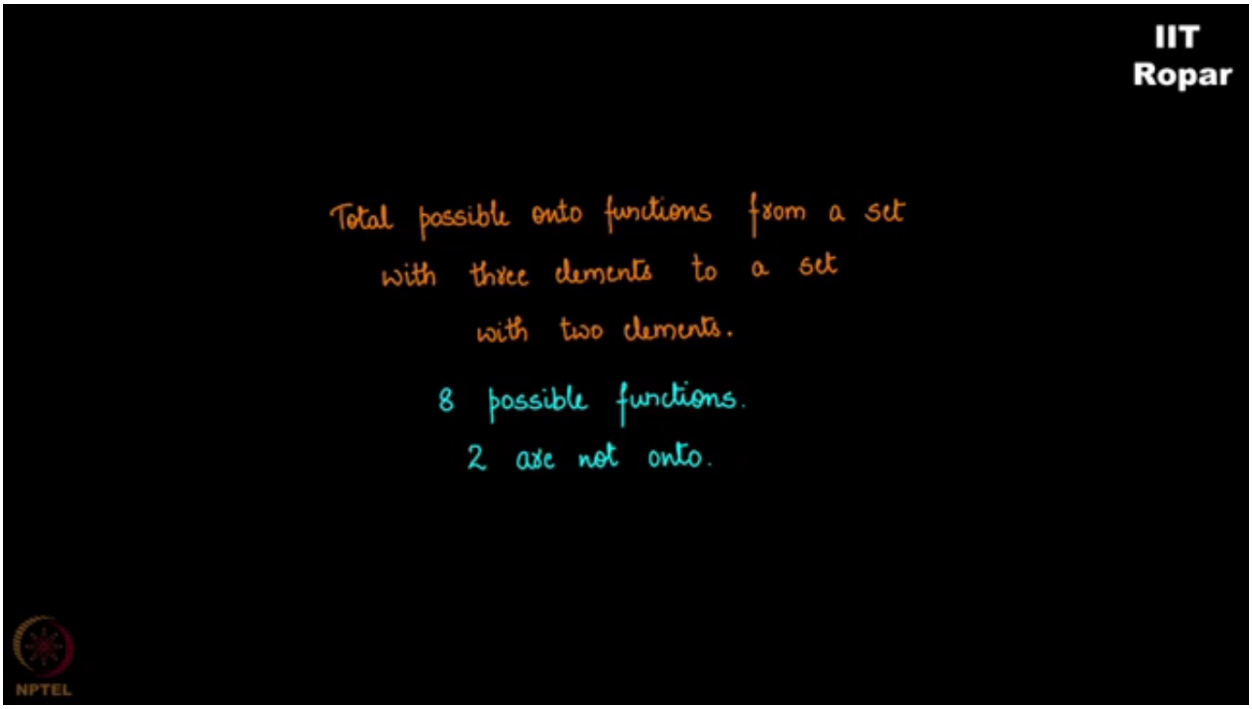


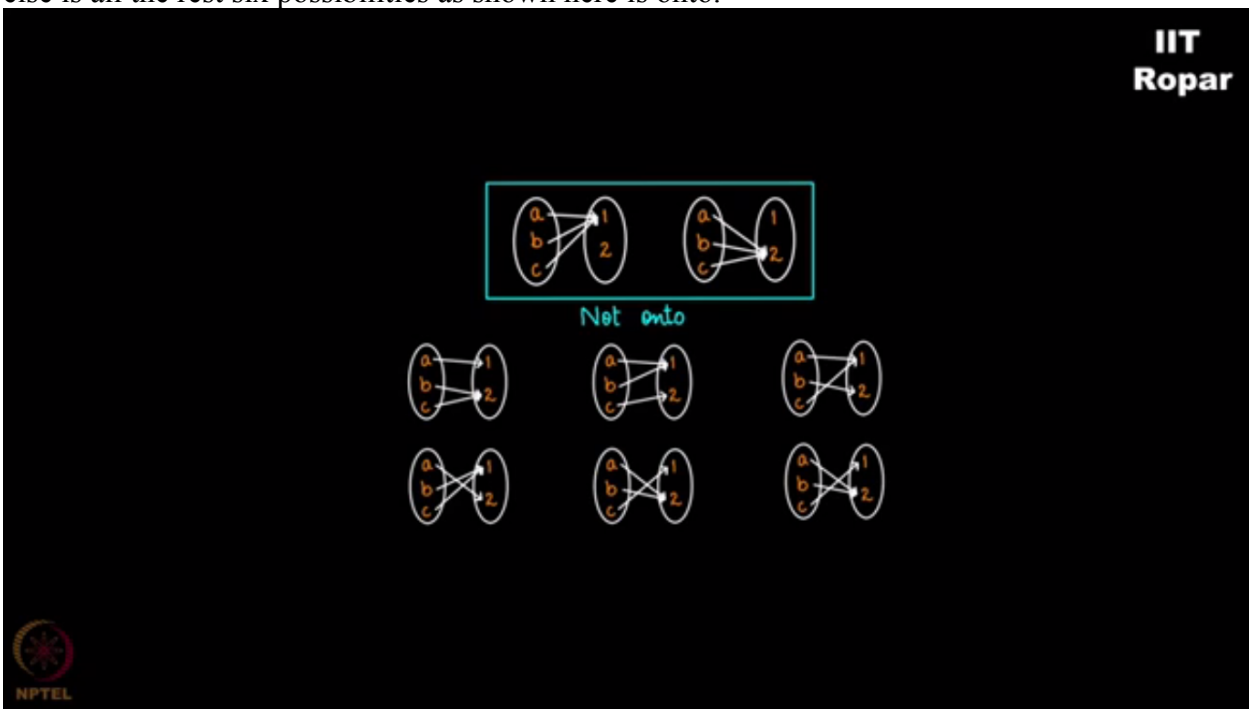
We spoke about one – one functions. We spoke about Onto functions. If you remember, we did count the total possible one - one functions from a domain of a few elements to a co-domain of a few elements.

Note that we can talk about the total possible one – one functions only when the cardinality of the domain and the co-domain is finite. Otherwise, we cannot talk about the total possible functions. Correct? Obviously, there will be infinitely many.

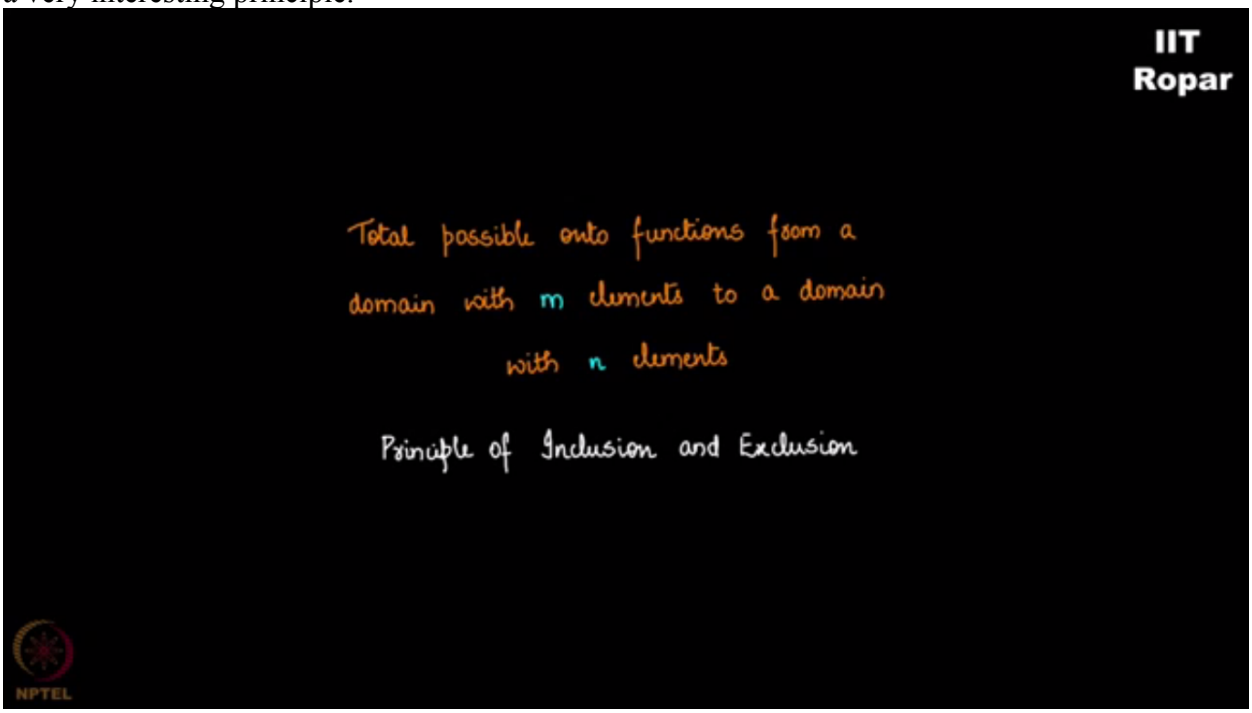
So let's talk about total possible functions that are onto from a set with let's say three elements to a set with two elements. As you can see, there are 8 possible functions, out of which precisely 2 of them are not onto.



What are those? a b c going to 1 and a b c going to 2. Except these two possibilities, everything else is all the rest six possibilities as shown here is onto.



We can in fact count the total possible onto functions from a domain with m elements to a domain with n elements. This involves a concept called the Principle of Inclusion and Exclusion, a very interesting principle.



So we will be doing that in our later chapter that is coming ahead. Right now I have only shown you that it's possible for three elements to two elements and one can enumerate and then show it, but how to pin it down with a nice formula, we will be seeing it in the forthcoming chapters.

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