NPTEL
NPTEL ONLINE COURSE
Discrete Mathematics
Logic
De Morgan's Law - Part 2
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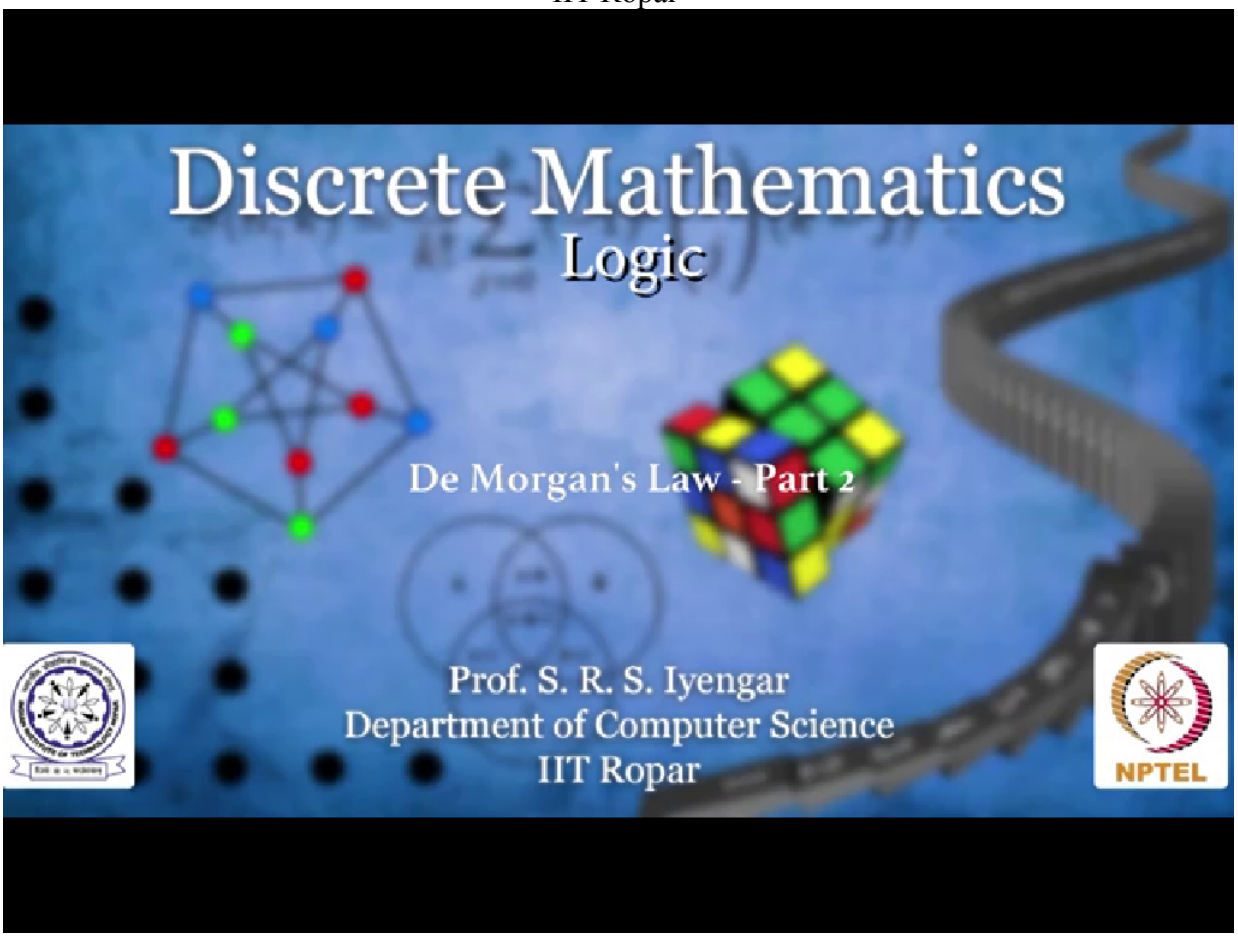
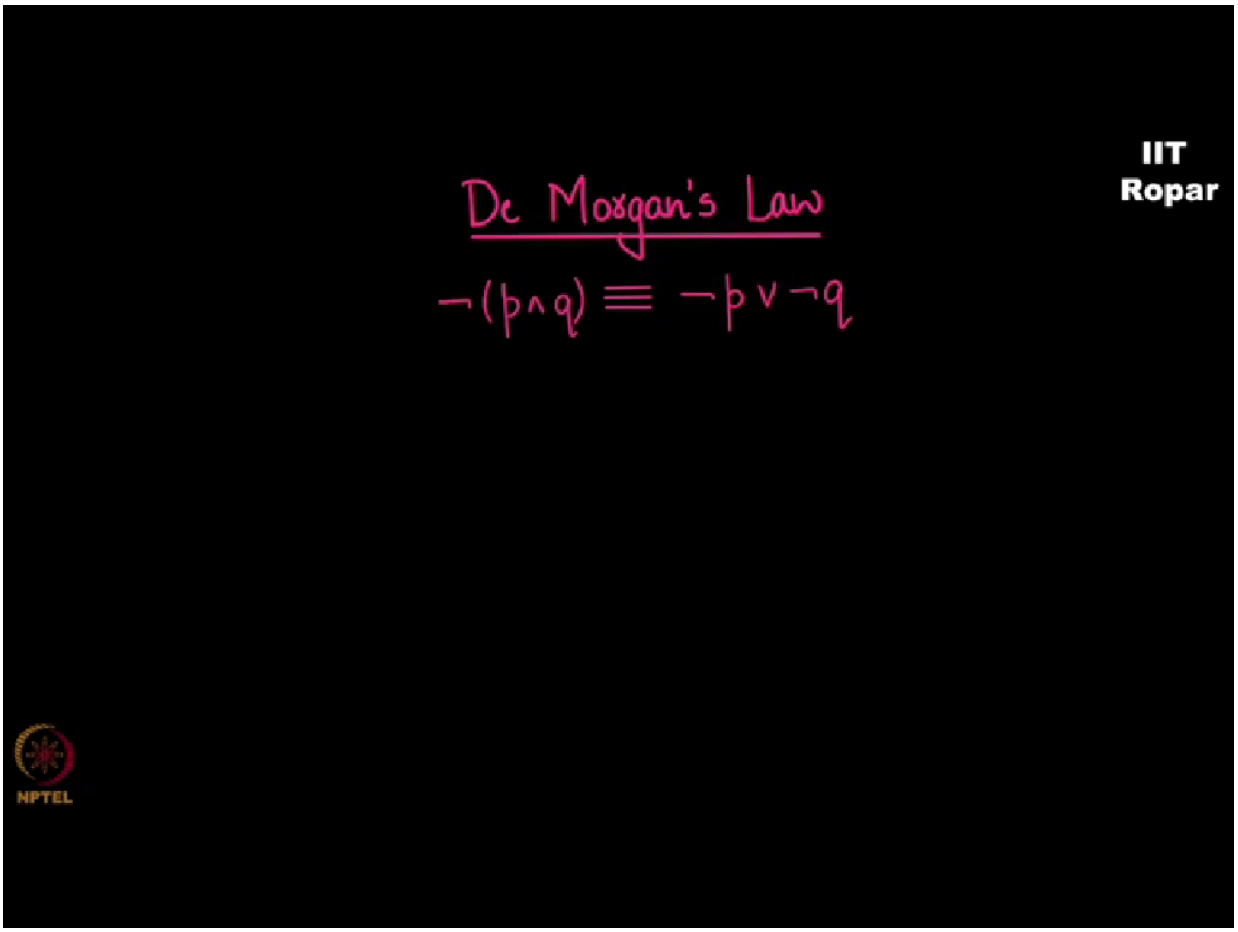


You would have observed that the example which I gave to explain this law “Both the ladies are good looking” is actually not a statement.

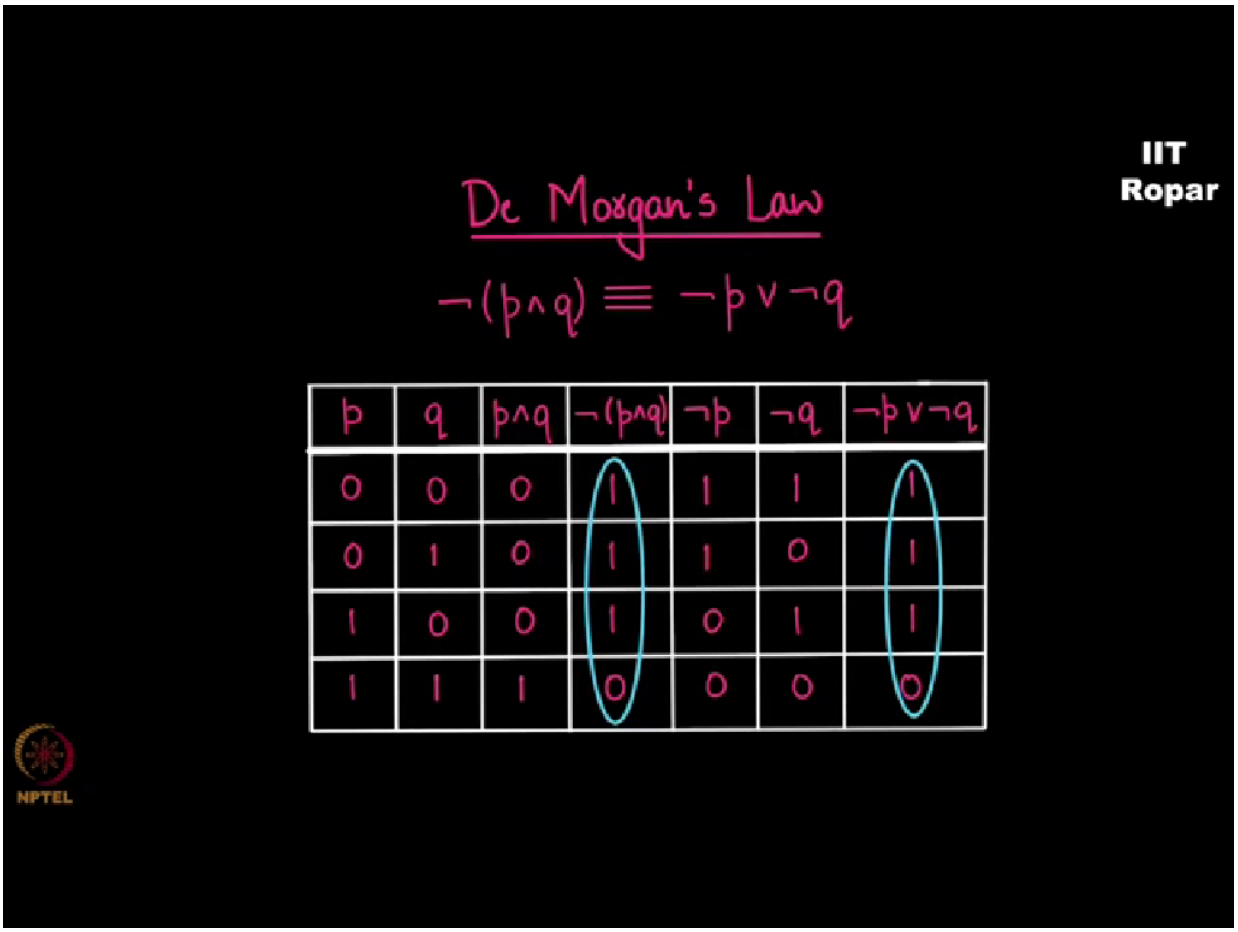
My choice of this example was simply because it was very easy on your minds. It is nice to see the negation of this statement.

Okay. Let us now look at De Morgan's Law a little more closely. It says NOT of (p AND q) is same as NOT p OR NOT q.

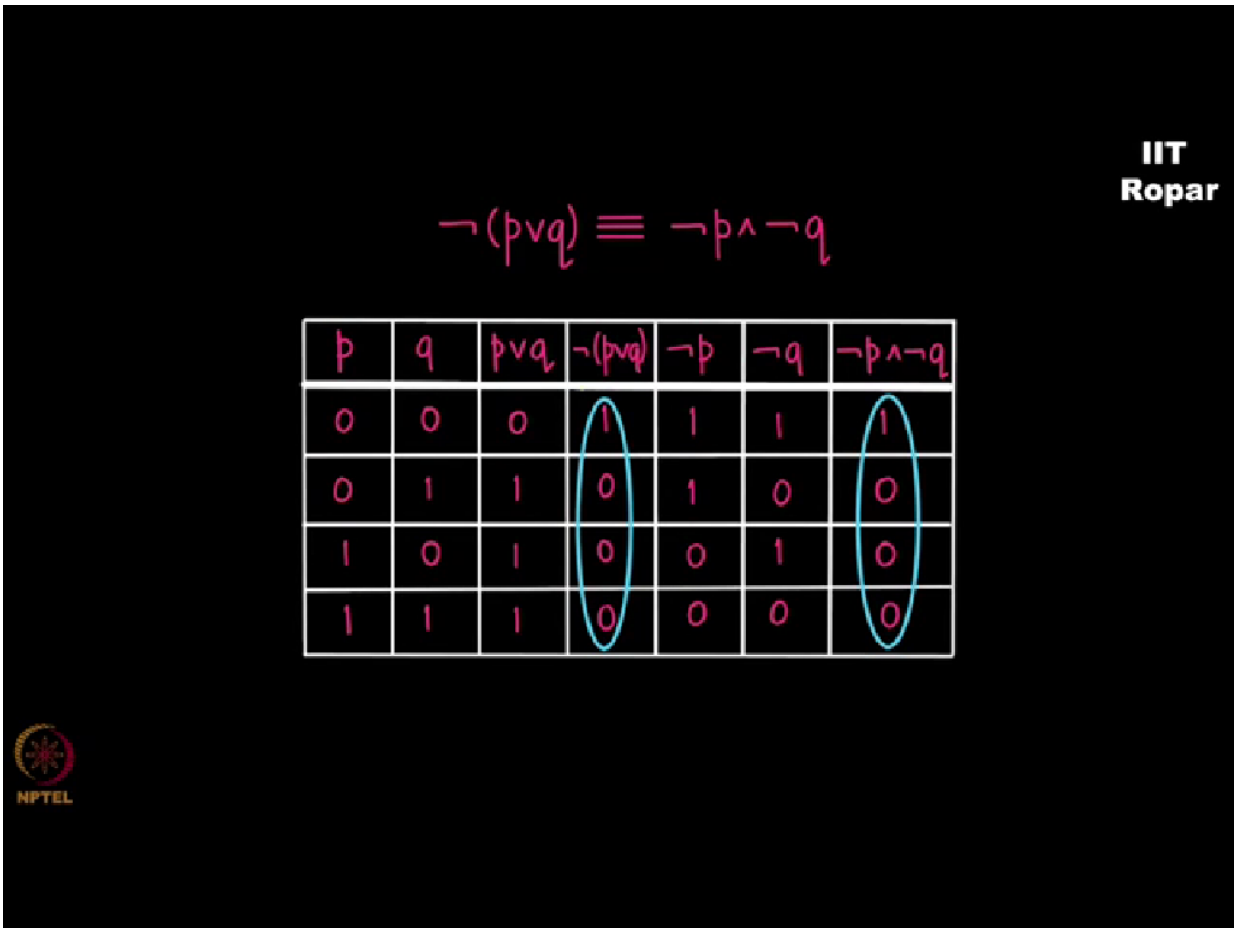


So you now know that equivalence means the corresponding entries in the truth table should match. Let's see if this happens or not.

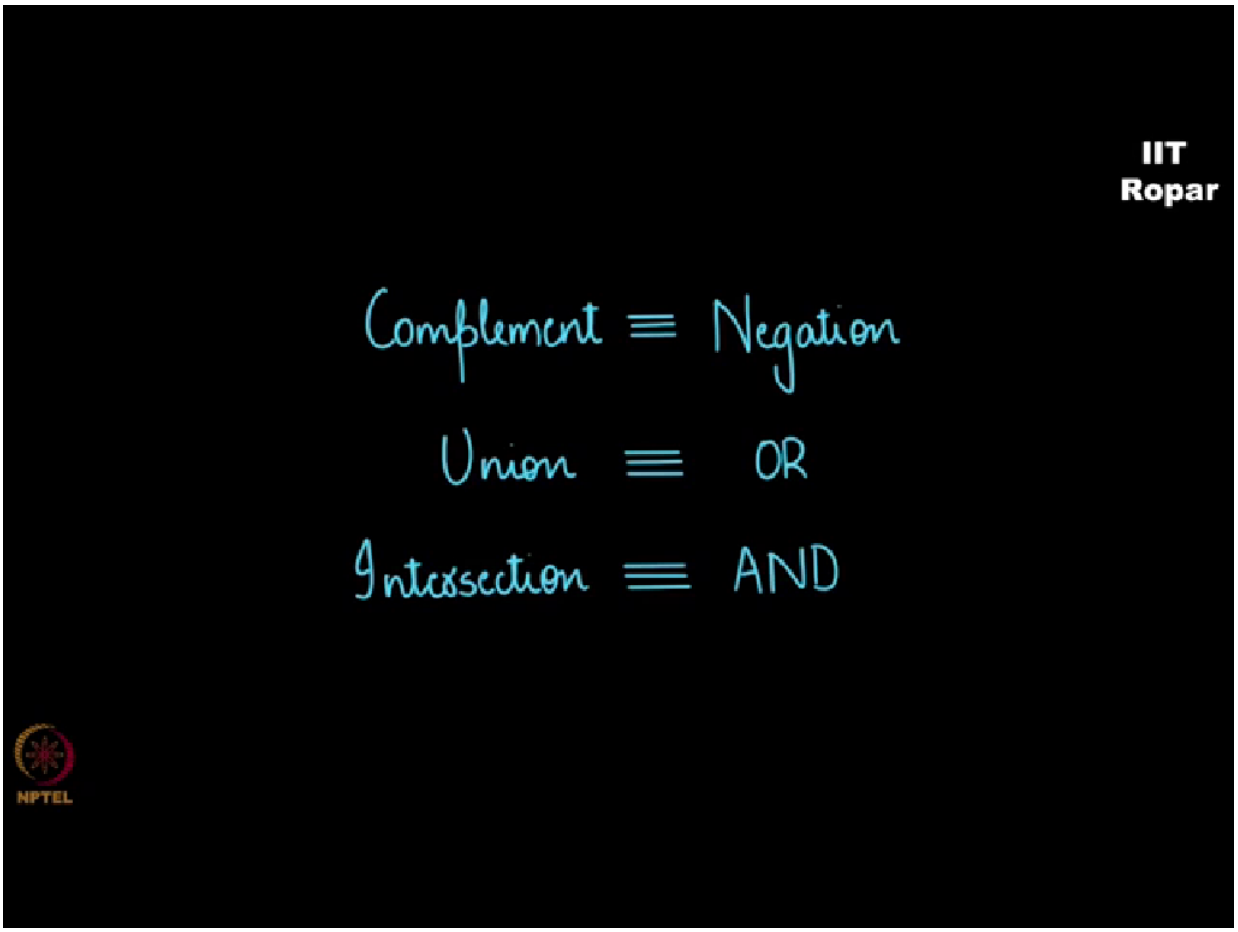
P, q, p AND q, NOT of (p AND q), then I will write NOT p, NOT q, and finally, NOT p OR NOT q. As I fill the entries, you should be able to do it all by yourself, you will observe that the fourth column and the seventh column match exactly.



So is the case with NOT of (p AND q) being equivalent to NOT p AND NOT q. Now look at the truth table here with these seven columns. Again, here the fourth column and the last column does match.



We verified these two laws. These are very important. By two laws I mean De Morgan's Law, two different versions. You can now connect De Morgan's Law to set theory. Complement actually is equivalent to negation. Union here is equivalent to OR and intersection is equivalent to AND.



So you see some sort of a similarity between the De Morgan's Law of set theory and the De Morgan's Law of logic.

Now that we have studied these laws, let us see the laws in action in the coming lectures.

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