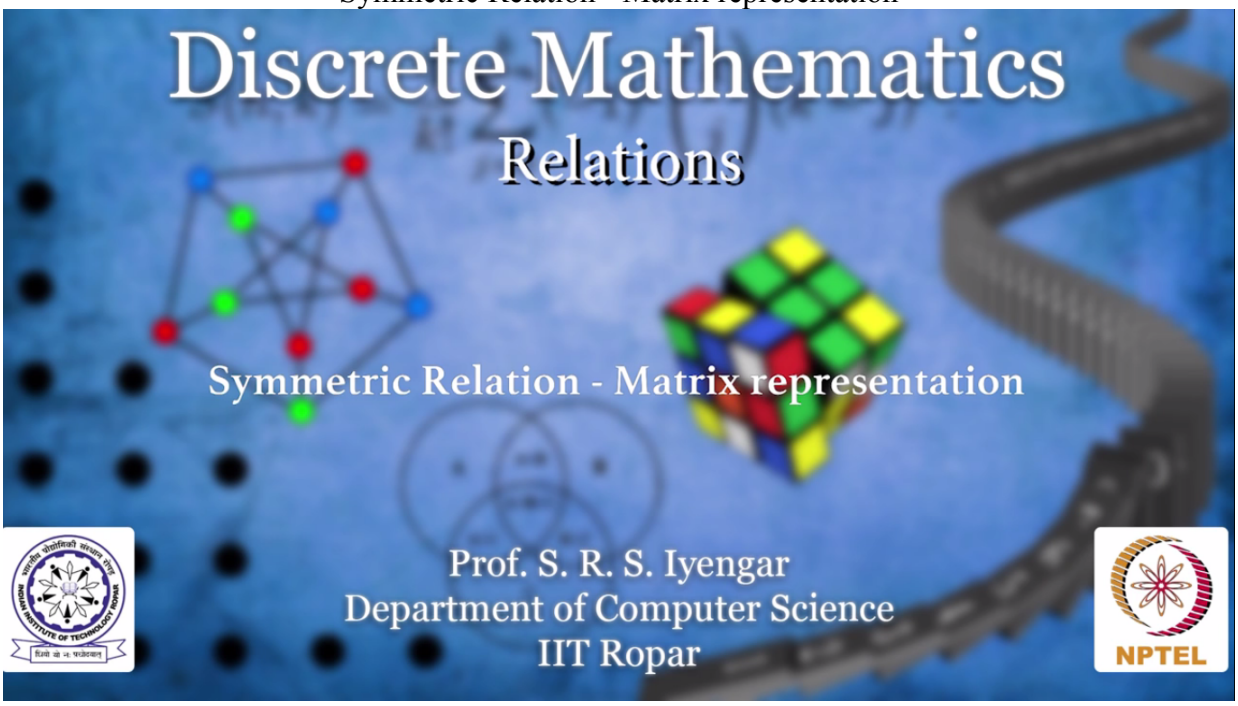
NPTEL
NPTEL ONLINE COURSE
Discrete Mathematics
Logic
Symmetric Relation - Matrix representation



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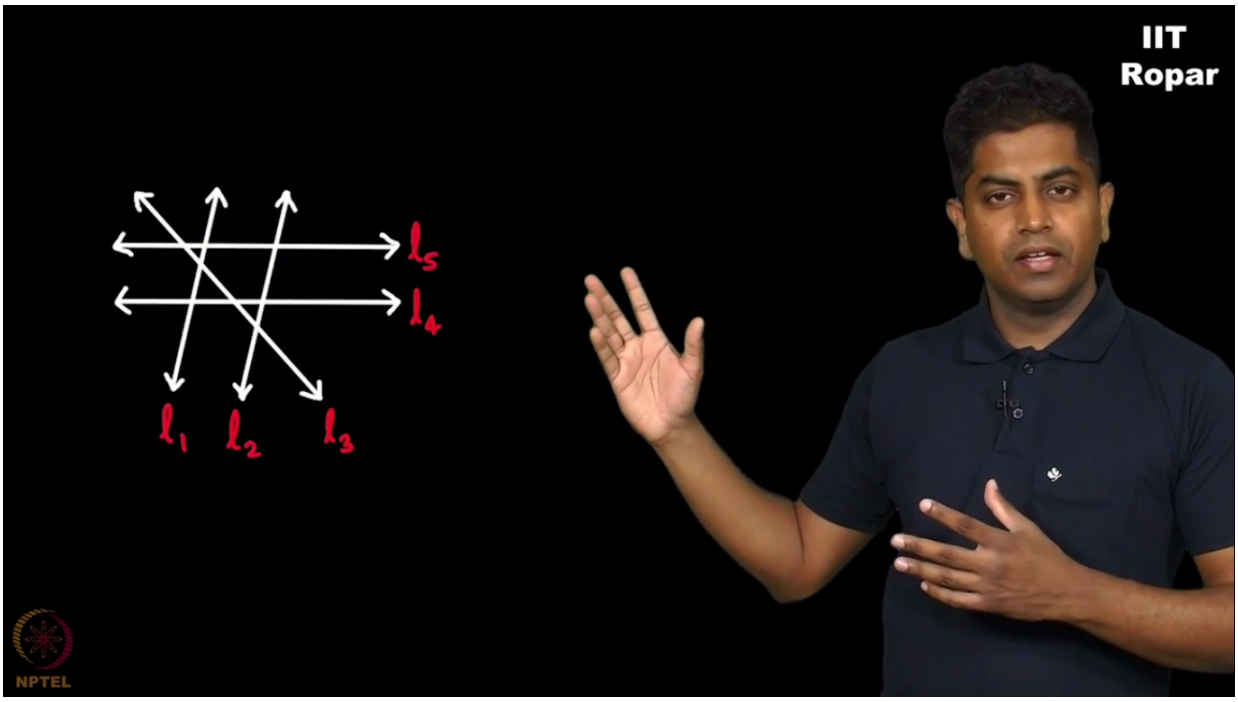
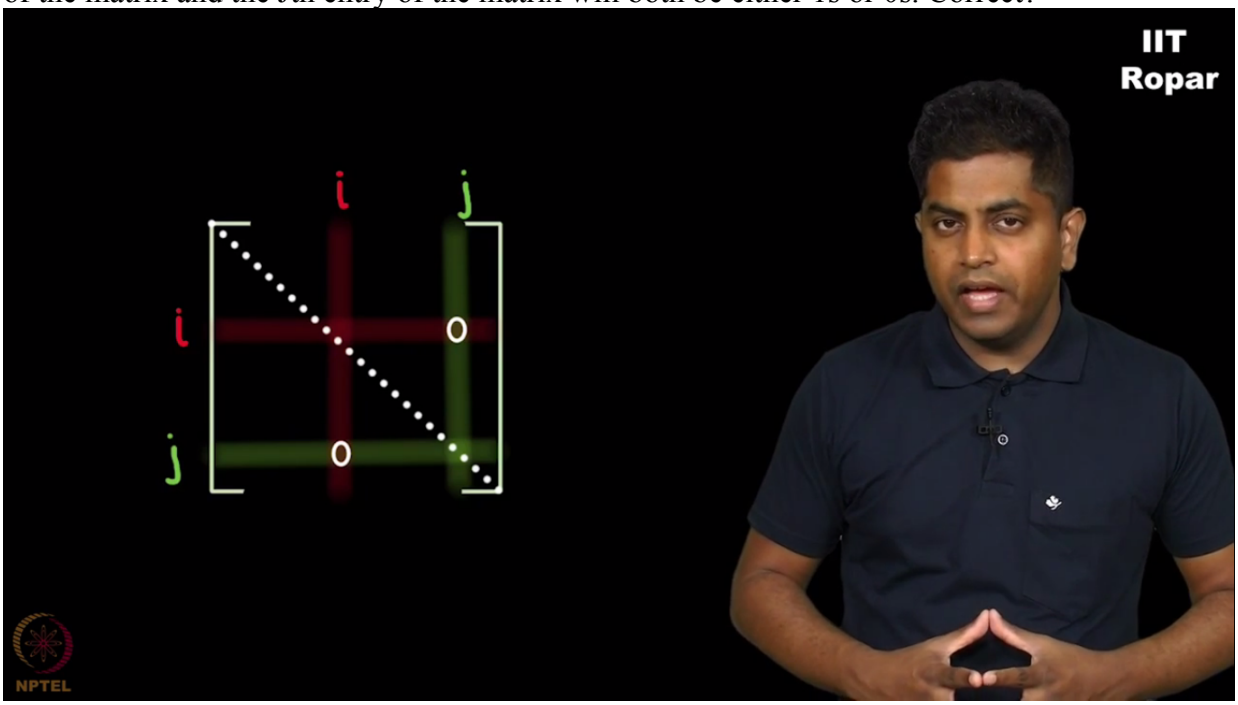
I'm sure things are getting easy on your minds. Let me ask you a question. I just now defined what is a symmetric relation. Can you tell me how does a matrix corresponding to a symmetric relation look like that of let's say parallel lines, or any symmetric relation you can think of? What's the rule there? What's the property of a relation that is symmetric?



Whenever A, B is there B, A should be there, correct, which means Ath row and Bth column will have a 1 whenever A, B is part of the relation but then if it's a symmetric relation B, A should also be present which means whenever Ath row and Bth column has a 1, Bth row, Ath column should also have a 1. So what do you mean by Ath row, Bth column and Bth row, Ath column? Think about it. As you can see they are two entries symmetrically across the diagonal of the matrix right. So pause and think if required. If a relation is symmetric then the Ith entry of the matrix and the Jth entry of the matrix will both be either 1s or 0s. Correct?



The matrix will appear like a mirror reflection of what is above the diagonal and what is below the diagonal. So formally speaking a relation R is said to be symmetric if whenever A, B belongs to R, B, A also belongs to R.