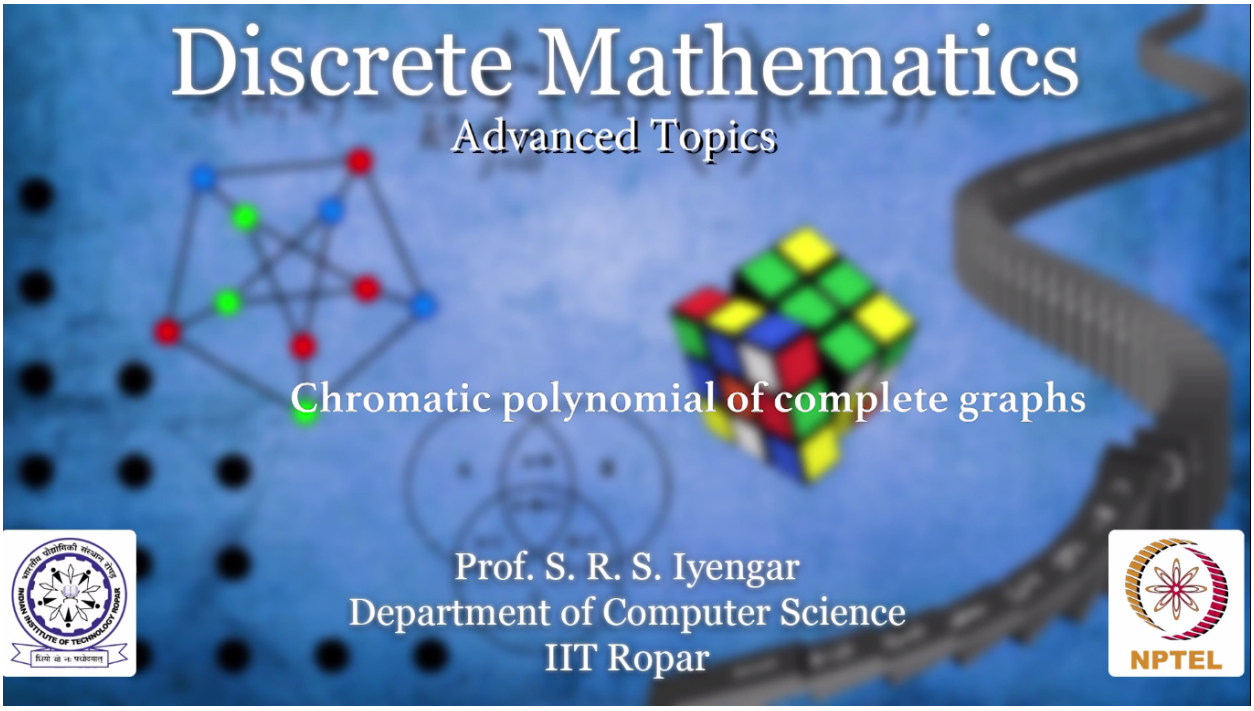
Discrete Mathematics

Functions

Advanced Topics



Chromatic polynomial of complete graphs

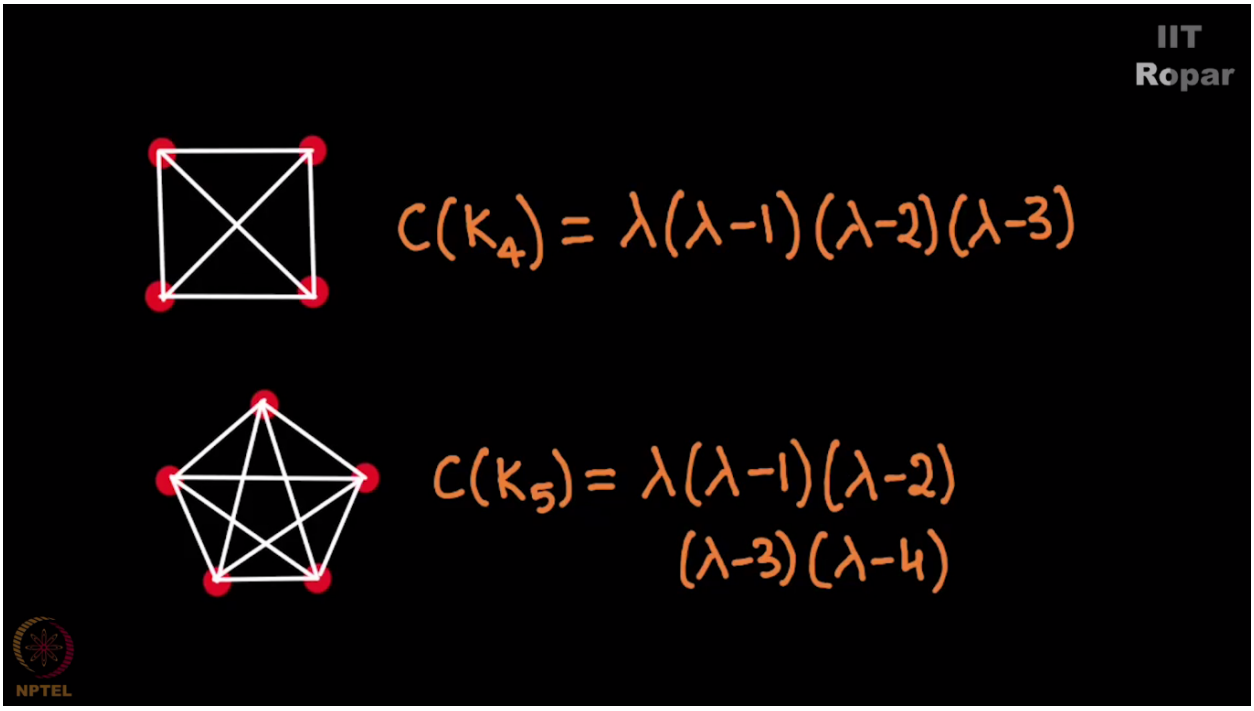
Prof S.R.S. Iyengar

Department of Computer Science

IIT Ropar

Let us look at the chromatic polynomial of a complete graph. Look at a triangle. Lamda color is here, lamda minus one color is here. Now finally for the third node you are left with two different colors consumed so you have lamda minus two colors left. So it is lamda into lamda minus one into lamda minus two for a complete graph with three vertices also called K3.

So what is it for K4? Think about it. Let me be fast here because you all know graph therory well. It's going to be lamda into lamda minus one into lamda minus two into lamda minus three for K4 and for K5, it's going to be lamda into lamda minus one all the five vertices right. Lamda minus 2 into lamda minus 3 into lamda minus 4. In general for K9 it's going to be lamda into lamda minus one so on lamda minus two so on into lamda minus n minus 1it will become lamda minus n plus 1. correct. That is the chromatic polynomial for Kn.



Now let us ask this question, what is the chromatic polynomial of this C4 a cycle with four vertices? Think about it.