DC Power Transmission Systems
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Lecture – 23
2 and 3 valve conduction mode of 6 pulse LCC: DC side voltage harmonics

So, in the last class, we got the expression for the DC side voltage, the instantaneous DC side voltage for one interval that is two sub intervals. So, we also got the expression for the average value of the DC side voltage and how the voltage on the DC side has an average value which is related to the one which used to be there in the case of zero inductors. So, we got some equations.

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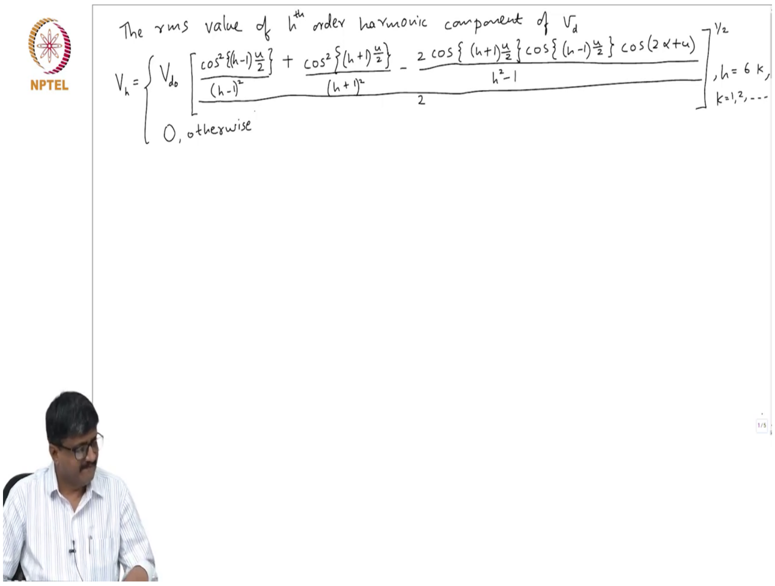

So, now let us see the harmonics that are present in the DC side voltage. So, the rms value of h th order harmonic component v d. So, V d is the instantaneous DC voltage. So, if I take the h th order harmonic component I mean the rms value id denoted by V with the subscript h. So, this has two expressions because for some values of h it is 0.

So, I will give the expression, I will leave it to you to derive. So, it is just an application of the Fourier series. So, the expression whenever it is non zero is given by V do into cos squared h minus 1 into u by 2 plus cos squared h plus 1 into u by 2. So, if the first term is divided by h minus 1 whole square, the second term is divided by h plus 1 whole square minus 2 cos h plus 1 u by 2 cos h minus 1 u by 2 cos 2 alpha plus u. So, this is divided by h square minus 1.

So, this entire expression is divided by 2 and this is taken under root. So, this is raised to half. So, this is V do into cos squared h minus 1 u by 2 by h minus 1 whole squared plus cos squared h plus 1 u by 2 by h plus 1 whole squared minus 2 cos h plus 1 u by 2 cos h minus u by 2 plus into cos 2 alpha plus u by h square minus 1 ok. So, this is the expression for V h whenever it is non zero. So, it is non zero for h equal to; so, what for what values of h it is non zero?

Student: 6.

6 into any positive integers this k. So, it is non zero for all values of the type 6 k where k is 1, 2 so on and it is 0 otherwise. So, this is the expression for the h th order rms component rms value. So, I leave it to you to derive this I mean it is just application of Fourier series.