DC Power Transmission Systems
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Lecture – 26
Extinction angle

I want to just give one more definition a new definition which will be useful later.

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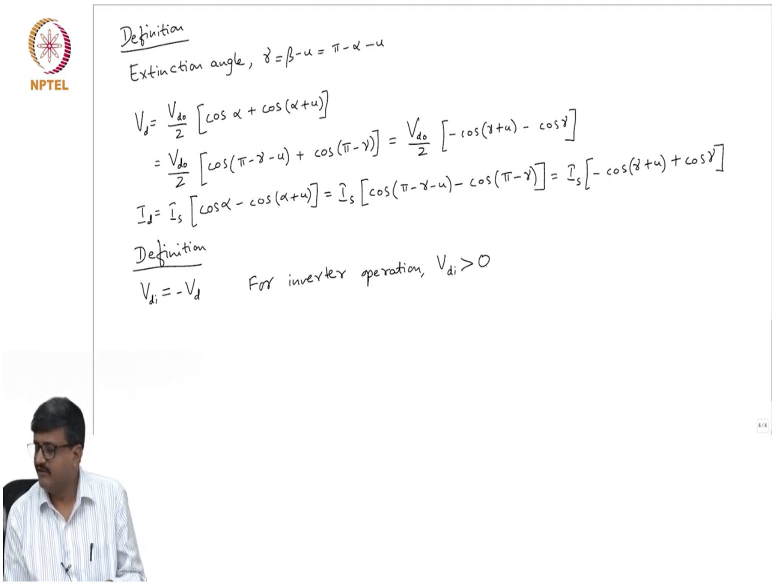

So, so, far we have made some definitions alpha, beta, u and then psi psi naught. There is one more definition which is extinction angle. It is denoted by gamma, the Greek letter gamma, the definition is beta minus u and we know the definition of beta. What is beta? It is pi minus alpha. So, it can be defined in terms of alpha and u also. Gamma is pi minus alpha minus u.

Now, what one can do is; try to get the expression for the average value of the DC side voltage in terms of gamma instead of alpha that is also possible. See, we know the expression for average value of the DC side voltage V d. So, we derived this, it is V d o by 2. So, you may not remember, so it is cos alpha plus cos alpha plus u may be two classes above we derived this equation.

So, what one can do is; try to write this in terms of gamma instead of alpha. So, one can do that. So, it is V d o by 2 into cos, alpha is nothing but, pi minus gamma minus u plus cos alpha plus u is pi minus gamma. So, that gives V d o by 2 into minus cos gamma plus u minus cos gamma.

So, this is just an expression in terms gamma and u and V d o of course, instead of alpha u and V d o that is all. Similarly, I can relate I d I s gamma and u. So, in place of I d can be related to I s alpha and u. So, we know the relation; it is I d is equal to I s into what? Cos alpha minus cos alpha plus u.

So, this was again derived a few classes ago. So, if you try to analyse the first sub interval, in the first sub interval you can relate this I mean using the expressions you can relate I d I s alpha and u.

So, this can be written in terms of gamma and u. Instead of alpha I can write it in terms of gamma. So, this is equal to I s cos alpha is pi minus gamma minus u minus cos alpha plus u is pi minus gamma. So, I can write this as I s into minus cos gamma plus u plus cos gamma. Now, I define one more quantity is one more definition it is just a notation Vdi; the definition is very simple it is minus V d.

See V d is the average value of the DV side voltage, if I take the negative I get V d i. Now, the purpose of this definition is, many a times while talking about inverter operation; the DC side voltage if you just take V d it is negative ok. So, we want some positive quantity for inverter operation for DC side voltage. So, we just define V d as negative of V d. So, V d i is positive ok.

So, that means for inverter operation; V di is positive ok. So, I will stop here, I will continue from this point in the next class.