Basic Electrical Circuits
Dr Nagendra Krishnapura
Department of Electrical Engineering
Indian Institute of Technology Madras

Lecture - 108
Summing Amplifier

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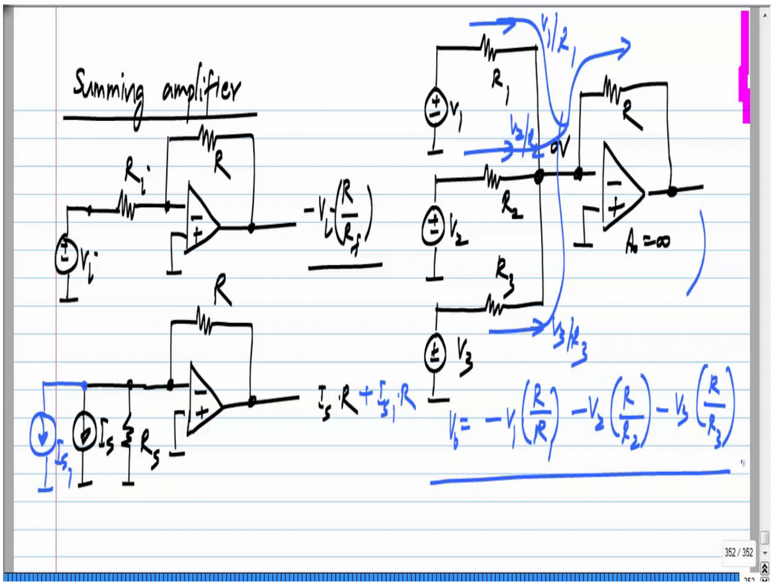

Another useful op amp circuit that is use sometimes is a summing amplifier, which is basically a very minor modification of the inverting amplifier. The inverting amplifier is this; and the output voltage is minus V I times R by R f. Alternatively, we can think of it as some current source, which is imperfect and let me call these R s. So, in this case, the output is I s times R. Now you can easily imagine that if I have multiple current sources, let say I s 1, and this R s could represent the effect of the resistance of this current source and that current source; the output would be I s R plus I s 1 times R.

The two currents are effectively summed. So, similarly by having more of these branches voltage sources in series with resistances, we can sum currents. Let us say, we have three voltages, you can have any number of them, and if we have an ideal op amp, this is at 0 volts, current V 1 by R 1 flows there, V 2 by R 2 flows there, and V 3 by R 3 flows over there. And all these currents have to go into the feedback resistor R. So, the output voltage would be minus V 1 times R by R 1 minus V 2 times R by R 2 minus V 3 times R by R 3. So, we get a weighted summation of the three input voltages and that is why this circuit is known as the summing amplifier.