Basic Electrical Circuits
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Lecture – 08

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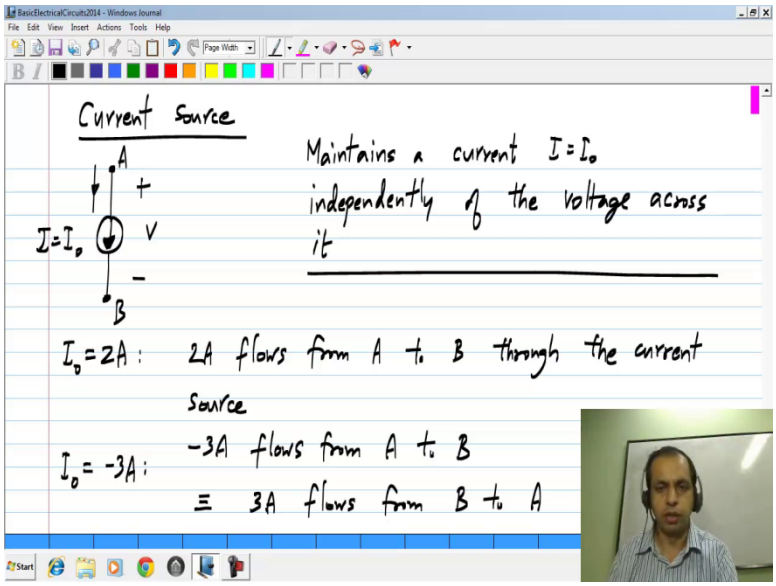

The next element we will be considering is a current source. So just like a voltage source maintains a given voltage between its terminals; a current source maintains a given current flowing through it. This is the simple for a current source, and this arrow denotes the direction of the current definition and that will be given by sum I naught. So since the current is flowing this way by passive sign convention V defined the voltage V across it to be that way. So what does the current source do it maintains a current I equals I naught independently of the voltage across it. It does not matter what voltage you have between these terminals A and B a current I equals I naught will be flowing through the current source so this is the meaning of it.

As before, the arrow indicates the direction in which the current is defined that current itself could be positive or negative. So if I naught happens to be 2 amperes, what it means is that 2 amperes flows from A to B through the current source. And if I naught is minus 3 amperes, what it means is minus 3 amperes flows from A to B, it is A to B, because the arrow inside is drawn from A to B. In this case, which is the same as saying three amperes flows from B to A; so all that current source does estimate in a flow of current regardless of what voltages across it.

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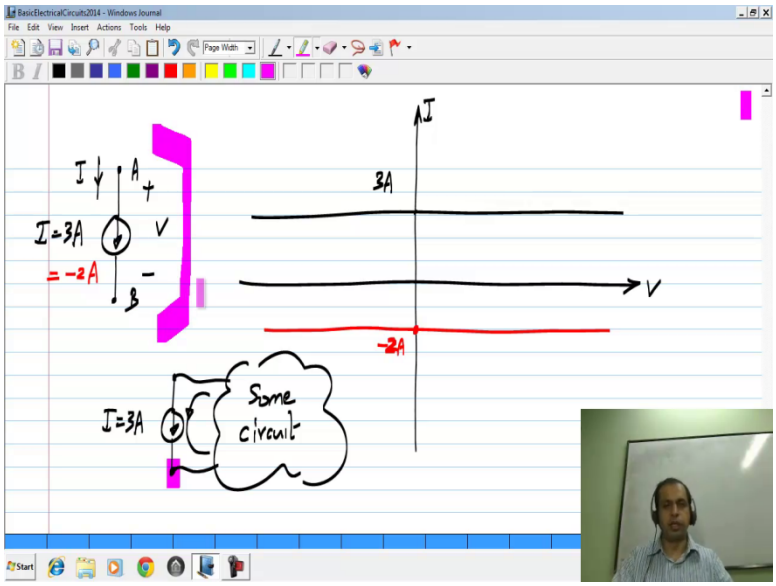

As with the voltage source we depict the characteristic of a current source graphically. So let us take a current source of value 3 amperes and the voltage is defined in this direction according to passive sign convection this is I that is V. Now it maintains a current regardless of the voltage so the characteristic is the horizontal line and drawn on the I V plane, so it maintains 3 amperes regardless of what voltage is across it. And similarly if in another case this happens to be minus 2 amperes, it will be a horizontal line, but below the x axis where this is minus 2 amperes so that is what a current source does it maintains a flow of current.

Now, there is one subtle point that I want to bring up here technically. It is not correct to draw a current source like this without anything connected to it, because let us say I take I equals 3 amperes, and if I take this particular node there is nothing else connected to it and we know that all the currents flowing into a nodes should obey Kirchhoff current law. So what it really means is that this has to be always connected to something, this is some circuit and a current will be flowing like this into the circuit. But of course, it is inconvenient to be a drawing in extra circuit each time you draw a current source, we do draw a current source like this without anything connected to it, but that is not a complete circuit something has to be connected to the current source.