Structural Reliability
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Lecture –114
Representation of Systems (Part -18)

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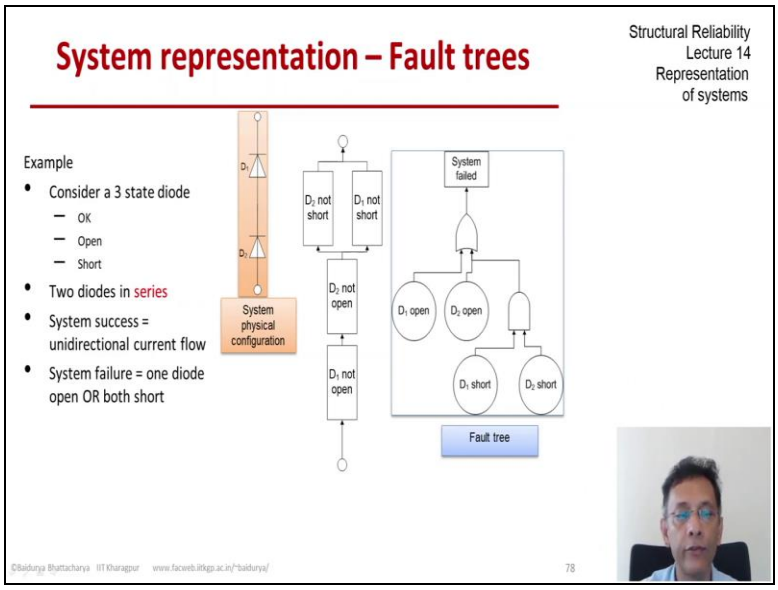

We now look at creating fault trees for systems composed of components that do not have a single mode of failure. We have looked at it this example a couple of times in the past it's a three-state diode two of them arranged in series and what you see is the system physical configuration and the as we remember very well. The system success is there is unidirectional current flow and the system would fail if any one diode is open or both are short.

So, we already derived the block diagram for this and we remember that we created a success event both in terms of not open and not short we can take this approach and take it to creating the fault tree. So, let us present the fall tree and let us go let us take a look at it part by part. So, the system failure that is the top event it is there is an OR gate below. So, D 1 being open it is one failure element. So, each failure mode now comes in as an element of the fault of fault tree.

So, D 1 open is an element D 2 open are another element and any one of them happening is tantamount to system failure. So, they feed into the OR gate but there's another contribution

when both of them are short. So, there is that is the third contribution into the or gate and. So, if D 1 is short and D 2 is short both of them they pass through the and gate and that is the third contribution into the or gate which leads to the system failure top event.

So, please note that we have D 1 open as one failure element D 2 open as one failure element d1 short as one failure element in D 2 shot as one failure element and there are four failure elements here and obviously they are not all independent I urge you to think and find out which of them are independent and which of them are not.

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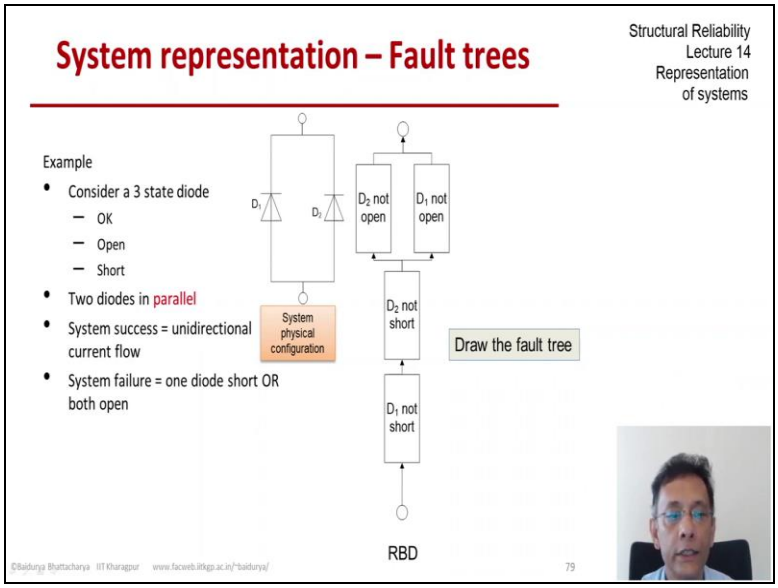

We go to the parallel configuration now of these two diodes and they are now that's the physical configuration that you see on the screen we have already created the RBD for this system. And what I would request you to do is now create the fault tree for this system. You would need to use those four failure elements that we had in the previous slide but you have to arrange them slightly differently and that would be nice way to understand how to model such systems.