Structural Reliability
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Lecture –113
Representation of Systems (Part -17)

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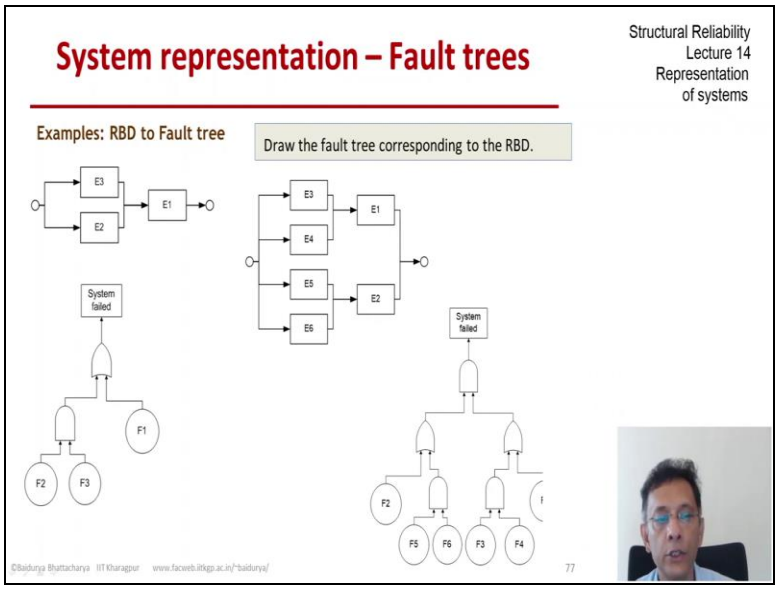

Let us look at two more examples of converting block diagrams into fault trees. Here we have a very simple three element system E1 element one in series with a parallel configuration of E2 and E3 we have looked at this earlier and now let us create the fault tree. The thing to remember is that the block diagram shows just a logical arrangement it does not show any sequence. So, we should remember that it is not like element one fails after two and three phase it's just a representation.

So, when we create the fault tree we do not give precedence or priority to any group like that. So, the top event is the system fails and again because they are arranged in series we have an OR gate and F1 which is failure of element 1 E1 that feeds into the or gate and F2 and F3 because they are in parallel they go through an and gate and then go to the higher level or gate. This we can expand we could go to the next problem in a similar manner it is also an arrangement like this but we have now two such branches in series.

So E1 with E3, E4 and E2 with E5 E6, so, let us see what the corresponding fault tree would look like. So, we will proceed the same way as we did for the example on the left for which we have already made the fault tree. So, we in the lower part you see on the on the lower right F1, F3 and F4 creating a very similar structure as we did in the first example. So, on the right part we have F1 going through and or gate along with F3 and F4 going through an AND gate.

So, that is the upper arm of the full system and on the left you see the subsystem created by F2 F5 and F6 elements 2, 5 and 6 and they have an identical structure and together these two subsystems these two failures go through an and gate because they are parallel arranged. So, both of these arms have to fail in order for the system to fail. So, that goes into the top event of system failure.