

ELEC 5970/6970 BIST

Assignment #7 More Circular BIST

Then you will need to do the following steps using collapsed fault lists:

1. Regenerate 1000 CBIST vectors using *cbistvec* with 4 reseeds of the CBIST chain. Run a fault simulation using the obtain a fault profile (*fltpro*) for this simulation. This gives the fault coverage that will be obtained by scanning in different states (or reseeding) to take the CBIST chain to different states in the state diagram and then let the CBIST run for approximately 200 or 250 clock cycles from the reseeded state; a hardware solution to limit cycling.
2. Remove the faults associated with the CBIST circuitry using *cbistrmf* and rerun the fault simulation using the modified fault list as the input fault list to AUSIM. This will give the fault coverage CBIST provides to the CUT without considering the new fault sites introduced by the CBIST circuitry.
3. Re-insert the CBIST circuitry using *cbistinr* (note that this time you should use *#ins* for your circuit as the *#muxffs* parameter since we will be using input isolation multiplexer flip-flops for this step to increase the number of flip-flops in the CBIST chain to see how the fault coverage will be improved). Regenerate the collapsed stuck-at gate level fault list for the complete (do not use *cbistrmf*) new CBIST circuit and run a fault simulation using the same vectors from Step 1. This will give the fault coverage for the CUT with the CBIST circuitry using additional flip-flops to increase the number of possible states and reduce the probability of limit cycling, another solution to limit cycling particularly for small circuits where the number of flip-flops in the CBIST chain is smaller than the number of inputs to the largest logic cone. Note that this also includes reseeding since you are using the same vectors from Step 1 so you are seeing a combination of these two hardware solutions to limit cycling.

Record (or calculate) the following data for each of the three fault simulations:

Total number of faults (these faults will be in *s#.flt*):

Number of faults detected (these faults will be in *s#.det*):

Number of undetected faults (these faults will be in *s#.udt*):

Number of potentially detected faults (these faults will be in *s#.pdt*):

Fault coverage:

Calculate the CBIST area overhead in terms of number of gates and in terms of number of gate I/O for the CBIST circuits obtained in Steps 1 and 3.

Use the results from the fault profile in Step 1 to plot the cumulative fault coverage as a function of the vector count for collapsed fault simulations to see if there are any increases in fault coverage immediately following reseeding.

Compare the fault coverage to that obtained in Assignment 6 – did reseeding improve the fault coverage? Did adding flip-flops to the CBIST chain improve the fault coverage?

Turn in your results on paper at the beginning of class on or before the assigned deadline.

More Happy BISTing!!!