# Chapter 6
## *Sequential Test*

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# Sequential Test - Issues

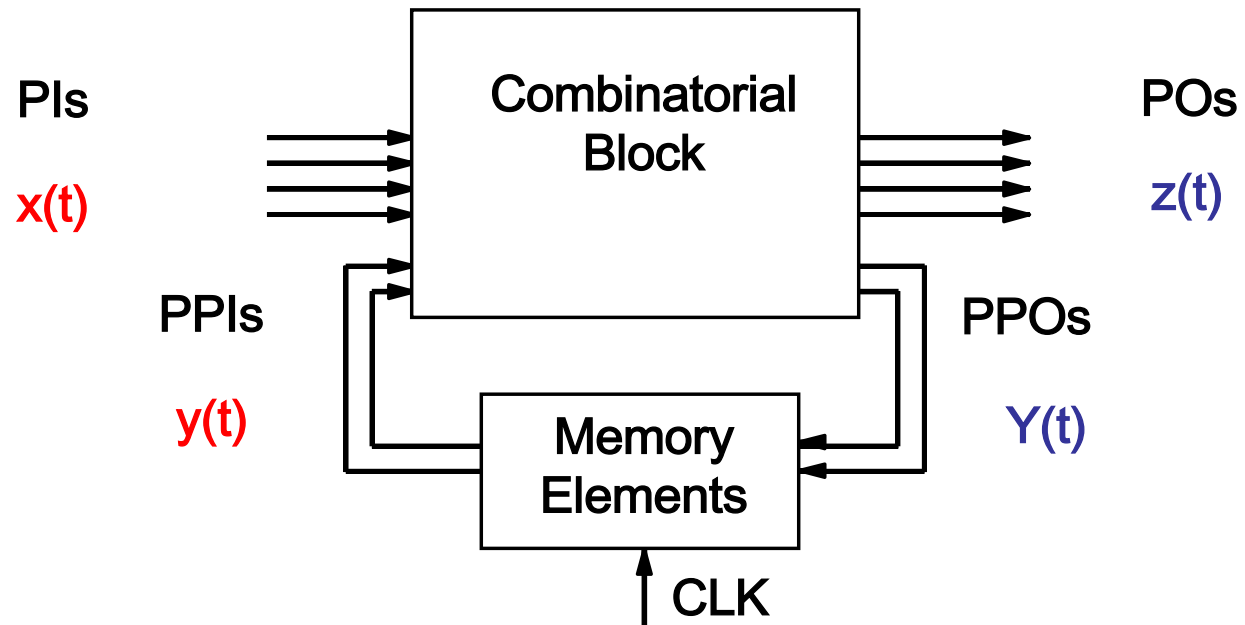- ## The test of a fault generally requires several vectors

- ## Structural issues
  - ### Cycles
  - ### Sequential depth
  - ### Reconverging paths
  - ### Flip-flop fan-out

  Combinatorial issues

# Sequential Test - Issues

- Behavioural issues
  - The density of valid states
  - The functionality

# Sequential Circuit Model



PIs

x(t)

PPIs

y(t)

Combinatorial
Block

Memory
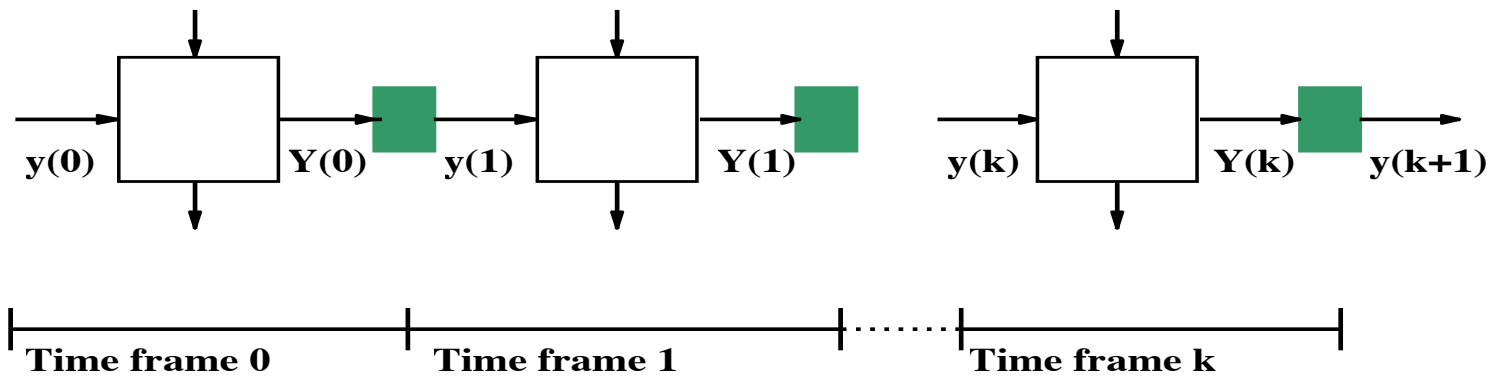Elements

CLK

POs

z(t)

PPOs

Y(t)

# Time Frame Representation

- The circuit is seen as a succession of (combinatorial) circuits over time

- The storage elements of the original circuit are modelled as registers which make the link between the different temporal copies of the combinatorial part
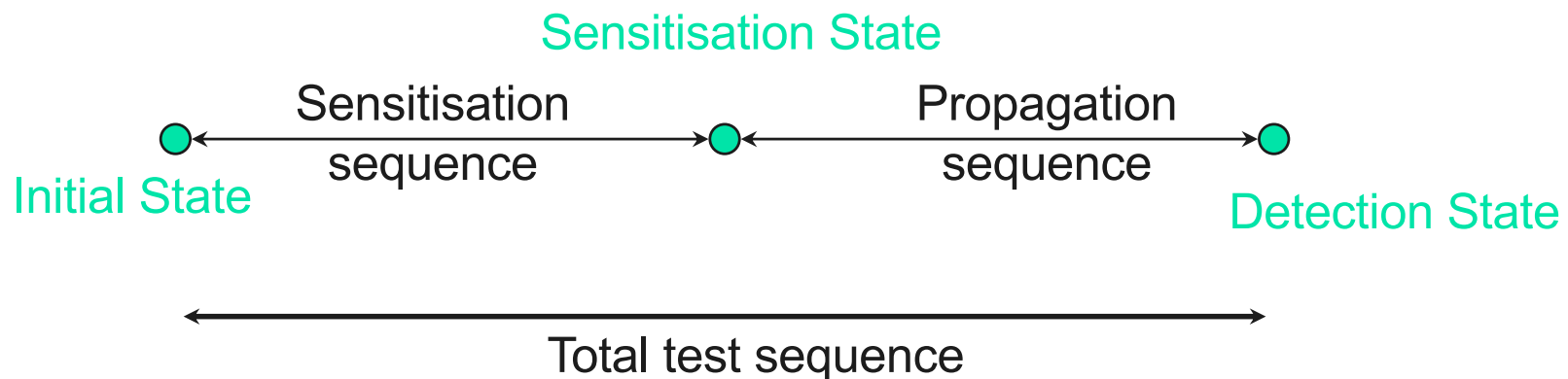
# Time Frame Representation

# Test Sequence

- Number of vectors in the sequence equal to the number of time frame needed

Sensitisation State

Sensitisation sequence

Propagation sequence

Initial State

Detection State

Total test sequence

# Sequential ATPG Process

- Generation based on topological circuit analysis

- Generation using circuit simulation

# Example