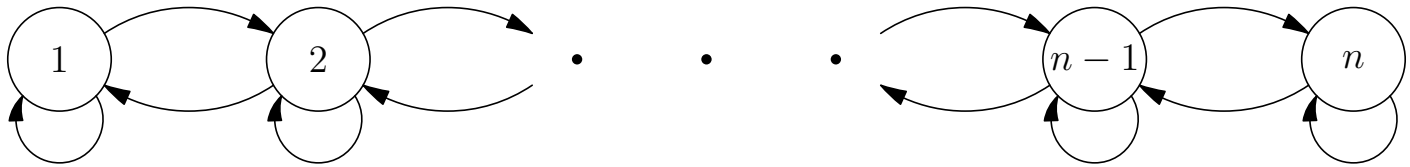
EE365: Shortest Path Example

Stochastic shortest path example



- chain of $n = 100$ nodes
- move from node 10 to node 90 in $T = 100$ steps
- can move forward one node, move backward one node, or stay put
- at each time step, lightning strikes with probability 0.3
- usually zero cost, unless lightning strikes, then cost at time t is
  - t to move right
  - -50 to move left
  - 0 to stay put
- minimize total expected cost

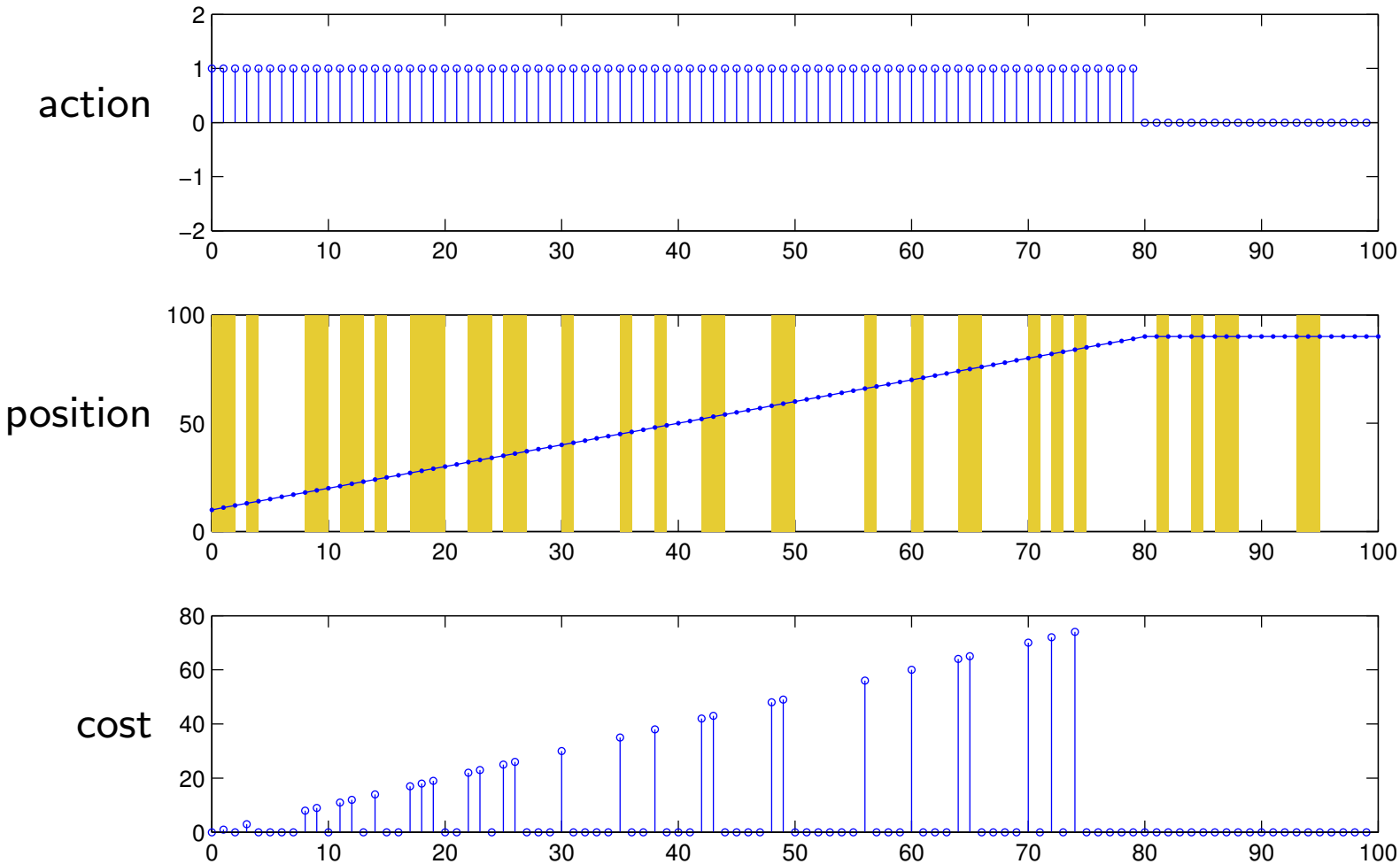
Information patterns

three different information patterns:

1. *open loop:* only know probability of lightning strike
2. *current:* at each time, know whether lightning is striking now
3. *prescient:* know times of all future lightning strikes

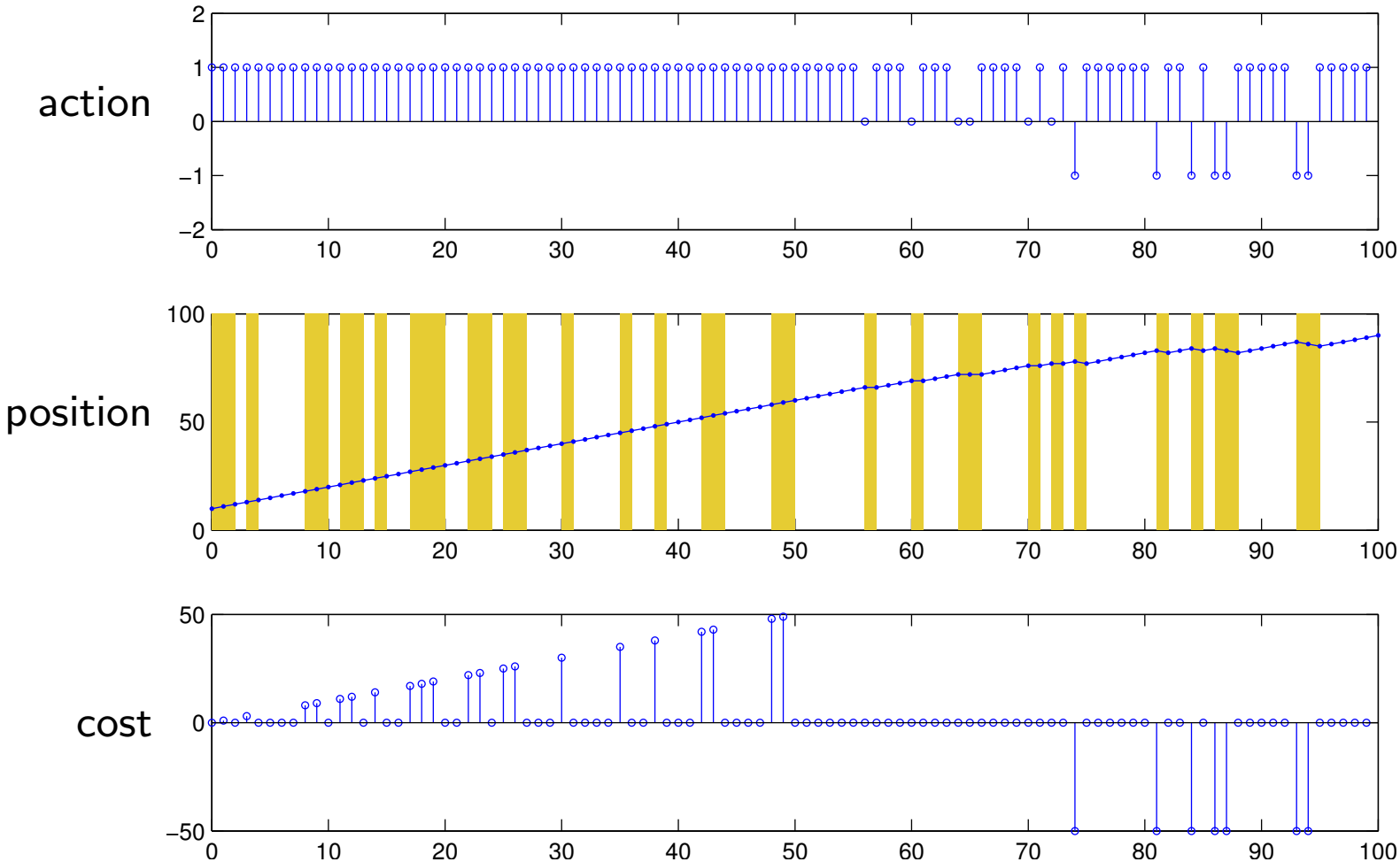
Open loop

37 lightning strikes, in yellow. Total cost $= 1283$



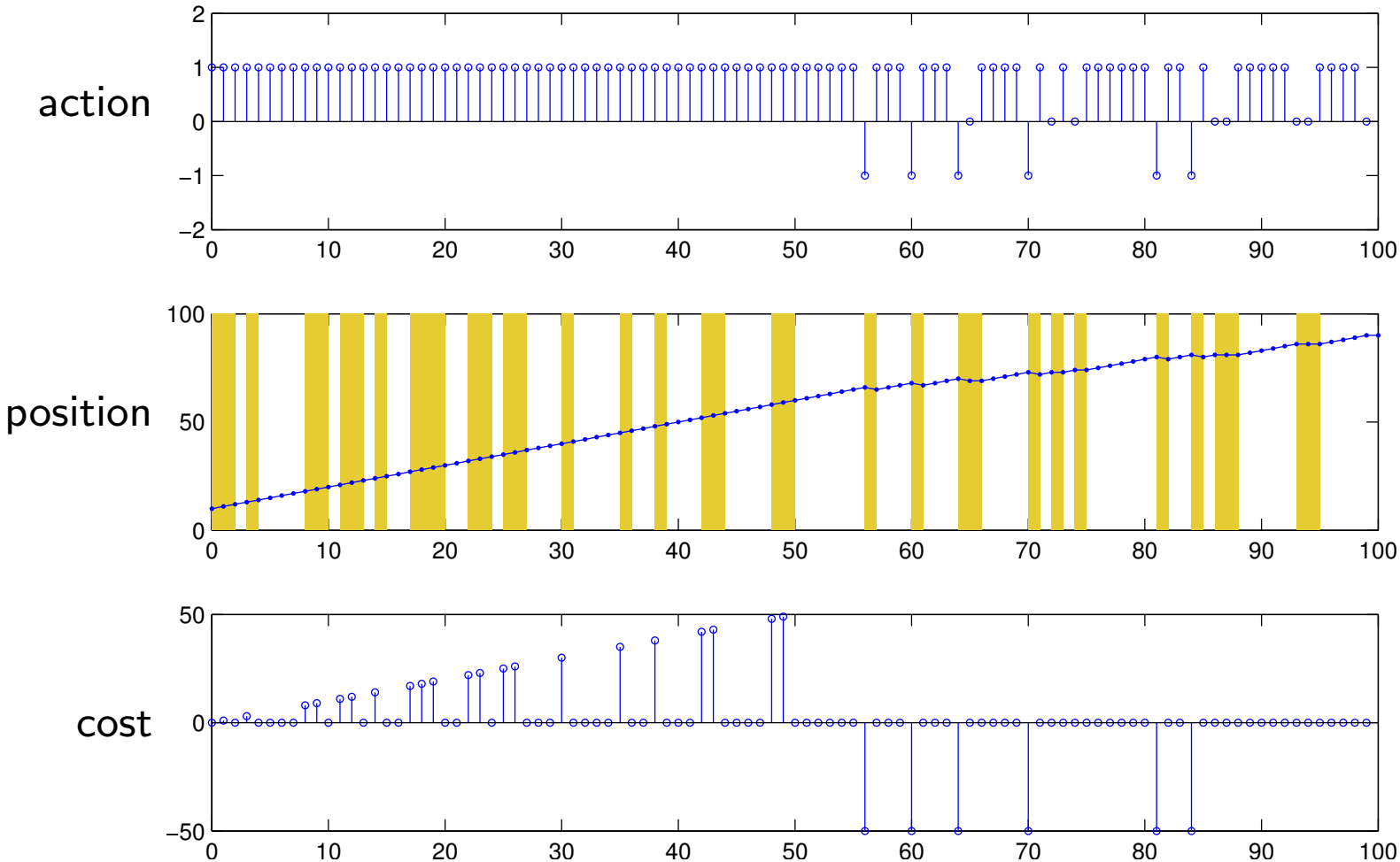
Prescient

Total cost $= 420$

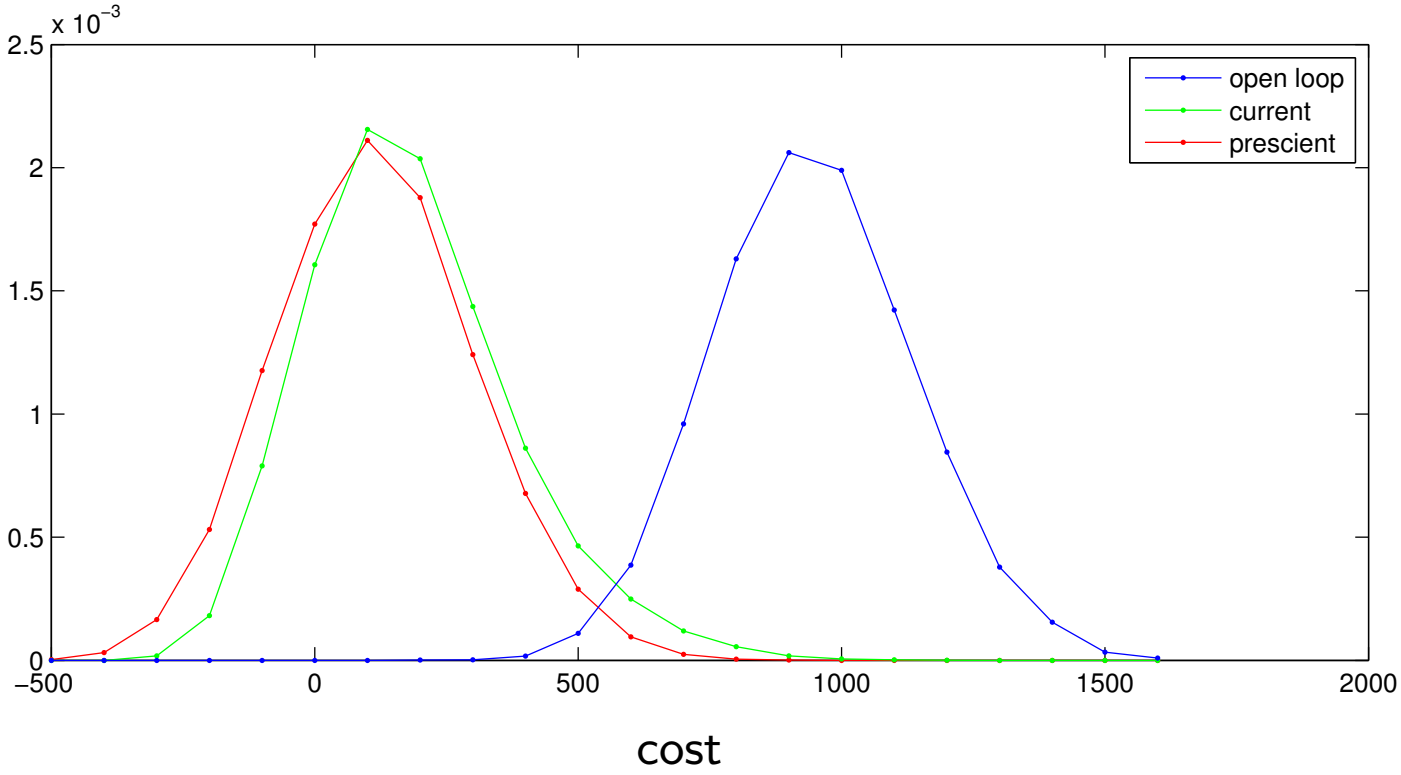


Current

Total cost $= 509$



Cost distributions



- cost distributions for each information pattern
- clearly shows value of information, recourse