

# Algorithm OPT1

## Complexity

- Time complexity:  $\mathcal{O}(V^3 \log V)$ .
- Space complexity:  $\mathcal{O}(V^2)$ .

# Algorithm FEAS

Given a synchronous circuit  $G$  and a desired clock period  $c$ , this algorithm produces a retiming  $r$  of  $G$  such that  $G_r$  is a synchronous circuit with clock period  $\Phi(G_r) \leq c$ , if such a retiming exists.

1. For each vertex  $v \in V$ , set  $r(v) \leftarrow 0$ .
2. Repeat the following  $|V| - 1$  times.
  - A. Compute graph  $G_r$  with the existing values for  $r$ .
  - B. Run Algorithm CP on the graph  $G_r$  to determine  $\Delta(v) \forall v \in V$ .
  - C. For each  $v$  such that  $\Delta(v) > c$ , set  $r(v) \leftarrow r(v) + 1$ .
3. Run Algorithm CP on the circuit  $G_r$ . If we have  $\Phi(G_r) > c$ , then no feasible retiming exists. Otherwise,  $r$  is the desired retiming.