

Legend

RP: red pebble
BP: blue pebble

Scenario

We consider a CDAG with:

S = 2 RPs
Q = 28 required load / store moves

1 Red-blue pebble game (§ 2)

6 Comm. optimal par. schedule (§ 5)

Legend

local domain of different processes

Scenario

$[N \times N \times N]$ domain decomposition
 $p = 65$
 $= 5 \cdot 13 = 4^3 + 1$

7 Parallel efficiency analysis (§ 5)

Different strategies are optimal depending on resources

Above
 $p \geq \left(\frac{3}{S}\right)^{3/2} mnk$
 parallel efficiency drops below 60%

Legend

subset in S-partition

dominator set minimum set

Objective

Find smallest 2S-Partition:
 $H(4) = 2$
lower bound:
 $Q \geq S(H(4) - 1)$
 $Q \geq 2$

2 S-partition (§ 2)

5 I/O Optimal Schedule (§ 4)

8 Domain Decomp. Optimization

10 Communication Optimization

Objective

Find smallest S-Partition:
 $H(2) = 6$
lower bound:
 $Q \geq (S - R(S))(H(2) - 1)$
 $Q \geq 5$

3 Reuse Based S-Partition (§ 3)

4 MMM I/O Lower Bound (§ 4)

Maximize computation / communication ratio
 ↓
 Maximize reuse
 ↓
 Minimize input and maximize output
 ↓
 "Flat" subsets in k dimension
 ↓
 $Q \geq \frac{2mnk}{\sqrt{S}} + MN$

9 Buffer Reuse Optimization

11 COMM -best time to solution in all scenarios