Parallel AMG Setup: decoupled aggregation

Given a user-defined threshold ε

Repeat

- Pick a new root point not adjacent to any existing aggregate
- Add neighbours which are strongly connected $\left(|a^k_{ij}| \geq \varepsilon \sqrt{|a^k_{ii} a^k_{jj}|}\right)$
- Mark all points adjacent to the aggregate

Until all points are marked

For all leftover points

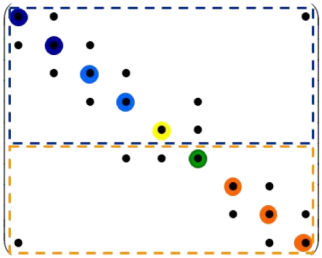
- Add to an aggregated neighbour over threshold; if multiple ones, choose

$$j : |a^k_{ij}| \geq |a^k_{il}| \quad \forall l$$

- If no neighbour is above threshold, start a new aggregate

Endfor

P. Vaněk, J. Mandel and M. Brezina, Algebraic multigrid by smoothed aggregation for second and fourth order elliptic problems, Computing **56** (1996)



- embarrassingly parallel but it may produce non-uniform aggregates
- generally it yields good results in practice on scalar elliptic problems (Tuminaro and Tong, 2000)