# Scalability, Coarse Spaces and Cross Points

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## Abstract

Scalability is a very important concept for domain decomposition methods, and for all classical domain decomposition methods like Schwarz, Dirichlet-Neumann, Neumann-Neumann, and FETI, there are coarse spaces that make them scalable when used as preconditioners for Krylov methods. It is also well known that these methods can be scalable without coarse spaces, depending on the geometry, the differential operator and the boundary conditions. Nevertheless, there are many open questions for coarse spaces and scalability that were sparked by the recent efforts to design coarse spaces to make domain decomposition methods robust for high contrast problems. We are interested in this minisymposium to exchange the most recent advances on the following fundamental questions:

1. Is a good choice of a coarse space dependent on the PDE that is solved?

2. Is a good choice of a coarse space dependent on the domain decomposition method used?

3. Are effective coarse space components different when domain decomposition methods are used as iterative solvers or as preconditioners?

4. How are good coarse space components affected by cross points in the domain decomposition?

5. Are there domain decomposition methods which contain implicitly already coarse space components?

6. Are there new one level domain decomposition techniques that lead to convergence independent of the number of subdomains ?

The speakers in this minisymposium will give their most recent insight to contribute answering these questions.

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