The purpose of this mini-symposium is to present specialized techniques for solving problems which require different modeling in different regions. The reasons for different modeling can be various: one might want to save computational time by using a simpler model in part of the region, where the simpler model is accurate enough, and a more sophisticated one close to the region of interest. This could even imply models of different dimensions, for example 1d-3d coupling in fractured domains. Another reason could be the quest for closed form solutions, for which the technique of matched asymptotic expansions was developed. A third motivation is that the physical properties can be fundamentally different in the two regions, like in fluid structure interaction for example.

Substantial research has been devoted to the question on how to couple such different models, and finding efficient algorithms to solve the coupled problem. In this context we distinguish coupling conditions, which are used to define the coupled problems, and transmission conditions, which are leading to subdomain iteration algorithms with fast convergence. At convergence, the transmission conditions imply in general the coupling conditions. This mini-symposium is giving an introduction to this subject through presentations by experts in this field, looking at the same problem from different angles.

Liste des orateurs

- Véronique Martin, *Etude d’un problème visqueux partiellement approché par un problème purement advectif*
- Carlo D’Angelo, *Multiscale models for coupled reaction-diffusion equations in 1D networks embedded in 3D domains*
- Giacomo Dimarco, *On some Kinetic-Fluid Coupling Strategies*
- Sébastien Tordeux, *Développement asymptotique des valeurs propres de l’opérateur div(α(x)∇) muni des conditions de Dirichlet sur un domaine constitué de deux cavités reliées par un petit trou*