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## Simulation of the Operation of the ITER Coils using a Domain

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The ITER magnet system has unprecedented complexity and stored energy, and its reliable operation will depend critically on the knowledge of the operating margins, and the optimal use of the large installed cooling capacity. We have tailored the system codes “glued” within the Supermagnet suite to perform simulations of the flow, temperature and operating margin during a sequence of plasma cycles as planned for the ITER CS, PF and TF coil systems. In this paper we describe the building blocks of the models of each coil system, the models assembly, and the motivation for the approximations taken. The approach taken is that of a splitting of the physical domain of simulation in a number of sub-domains coupled through a communication manager, i.e. a domain decomposition method. Examples of simulations and comparison to previous results are shown to demonstrate the overall functionality. Finally, we show how the model allows for detailed inspection of very detailed features in space and time.

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