

Titre : A generic fast multipoles method library

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Joint work with Yvon Lafranche, initiated in the framework of the project ANR Microwave

The fast multipole method (FMM) was introduced in the 80's and is nowadays widely used but the application of the method to a new configuration or new code is always quite challenging. At the Research Institut of Mathematics of Rennes, we are developing a generic fast method library named FastMMLib. The library is developed on the basis of a generic expression for the kernel to be efficiently evaluated. The interaction with the user is made such that the library deals entirely and only with the FMM ingredients. This means that the user do not need to know about FMM and, on the other side the library interacts with the FE framework of the user or whatever discretization he uses. The library is written in C++ and contains a specific class to ensure the consideration of the user framework (FE, quadrature rules, ...). FastMMLib has been designed including a regularized FMM and could also include other kinds of fast methods such as H-matrices and some families of kernel-independent FMM.