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Hierarchical and heterogenous approximations on heterogenous meshes - implementation in MoFEM

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MoFEM [1] (Mesh Oriented Finite Element Method) is a C++ library supporting the solution of finite elements problems. It is developed to provide a free and open finite element code for engineers, students and academics. It is tailored for the solution of multi-physics problems with arbitrary levels of approximation, different levels of mesh refinement and optimised for high-performance computing. It is also designed to be able manage complexities related to heterogeneous order of approximations for L2,H1,H-div and H-curl spaces, for example see [2].

MoFEM is the blend of the Boost MultiIndex containers, MOAB (Mesh Oriented Database) [4] and PETSc (Portable, Extensible Toolkit for Scientific Computation) [3].

It is open-source software under the GNU Lesser General Public License. MoFEM can read and write a number of different mesh file formats using functionality provided by MoAB. The current version of MoFEM has full support for Salome, CUBIT/TRELIS, TetGEN and NetGEN for pre-processing and ParaView for post-processing.

The MoFEM library itself is designed to be small, modular and extendable. Users can implement modules as independent projects, located in its own repository, which can be either public or private, with their own copyright and license. Such flexibility, allowing for privacy and different licensing parts of the code, is designed to accommodate the needs of both academics and industry. Since each user module is implemented in MoFEM using its internal database, data between modules can be exchanged without prior knowledge of how each module is developed.

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