Opt-IGFEM-2D: Developer's Guide

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1 Structure of program

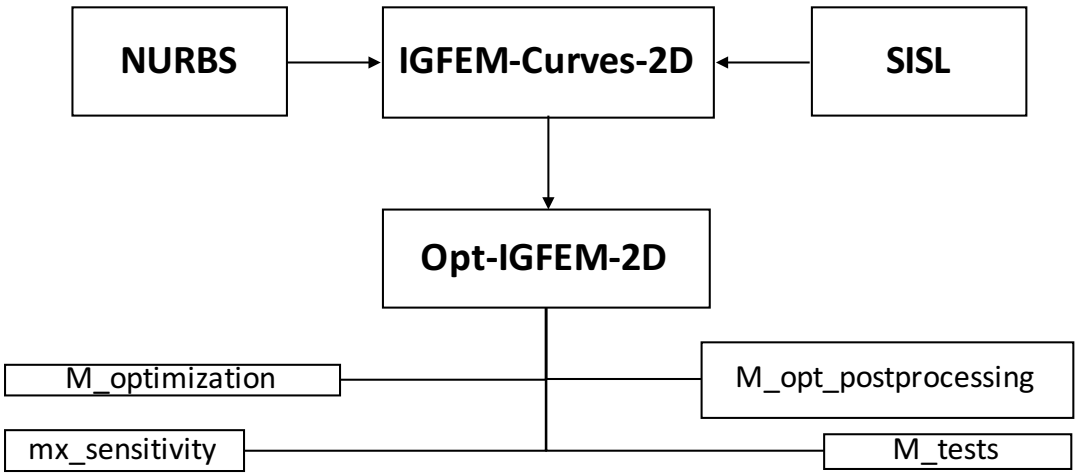

Figure 1: The directories (in bold) and subdirectories of the program.

2 Checking sensitivity analysis

The recommended first step to check the sensitivity analysis to is to compare the derivatives of the stiffness matrix and load vector wrt to a design parameter for the coarsest mesh with those obtained with finite difference. The derivatives resulting from the sensitivity analysis can be printed in MATLAB (but not output) by uncommenting the `#define SHOW_DK_DP` directives in `sensitivity.h`, `assemble_pseudo_adjoint_forces.cpp` and `IGFEM_element_pseudo_adjoint_forces.cpp`. One can then compare that derivatives with derivatives obtained from finite difference. The finite difference derivatives can be obtained by using the script `check_DK_DP.m` in M_tests (to be updated).

The next step is to compare the derivatives of the objective function obtained from sensitivity analysis with the finite difference derivatives using `test_objective_derivatives.m` in M_tests

3 Future Development

The case of a moving channel inlet is currently under development for the Opt-IGFEM-3D project. Once this is done, the Opt-IGFEM-2D project would also be updated to include that case.