OOFEM.org - project status, challenges and needs

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The paper describes the object-oriented design of OOFEM [1], a general, open-source finite element solver. The design combines several design approaches, that contribute to highly modular and extensible structure and that allowed sustainable development over the last two decades. The current capabilities cover multi-physical problems, including solid mechanics, transport and selected fluid-mechanics problems. The parallel computations are supported on both shared and distributed memory systems with interfaces to several high performance sparse solver libraries including PETSc, Pardiso, and SuperLU.

The aim of the paper is also to discuss some challenges and needs not only for the future development of the code, but also for the open-source modelling community. As for any open source project, the active user base is essential. Having in mind the size of potential community on a global scale, we have to actively disseminate our work and bring more people to using open-source simulation tools. In many areas this is a challenge, especially when approaching or collaborating with industrial partners.

In a long-term perspective, we believe it is essential to focus on interoperability between simulation tools. Each software has its strong capabilities and it makes a lot of sense to combine different simulation tools to solve complex problems. The open source modelling community can be the driving force to establish an open interoperability standard. This can attract new users and support our projects.

Also, the community must look for ways how to convince the funding agencies and get a public funding for open source modelling tools. In most of the cases, the projects are supported indirectly, by various research projects. While this allows for development in specific direction, it typically does not allow to support fundamental development which is essential.

REFERENCES

[1] B. Patzak, et.al: OOFEM project, www.oofem.org, 2018.