Tanatloc: A FreeFEM graphical user interface

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Abstract

Developing a seasonal energy storage system, is one of the Airthium principal goals. In order to accomplish this goal, many physical simulations must be done, and FreeFEM [1] was selected for this mission. The physical simulations encountered are very varied, we can cite for example, fluid and solid mechanics, in addition to contact mechanics [2]. As in most numerical simulations, the physical problem remains the same, and our final users are our mechanical engineers, a graphical user interface of FreeFEM is very useful to run the simulations and to choose the corresponding parameters without worrying about the FreeFEM code. We developed this graphical user interface of FreeFEM, called Tanatloc, which can help

- importing 2D and 3D geometries
- choosing the finite element type and the solver
- choosing the materials and selecting the boundary conditions
- running the simulation locally or in the cloud and showing the results

Tanatloc is now available and open-source on the internet[1][2], and integrate a code editor allowing researchers to create their own algorithms and take advantage of the corresponding graphic interfacing. In this presentation, we will present Tanatloc, and simulate live an applied example.
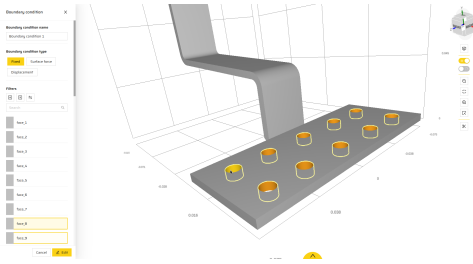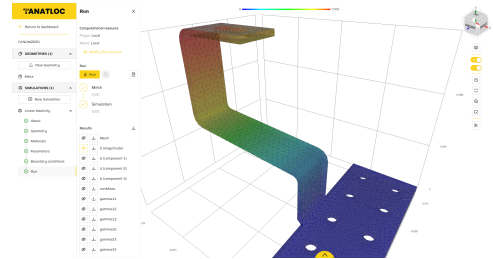
Figure 1: Tanatloc, Selecting boundary conditions

Figure 2: Displaying results

References

[1] F. Hecht. New development in freefem++. *J. Numer. Math.*, 20(3-4):251–265, 2012.

[2] Houssam Houssein. *Finite element modeling of mechanical contact problems for industrial applications.* PhD thesis, Sorbonne Université, 2022.

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[1] https://tanatloc.com
[2] https://github.com/Airthium/tanatloc