Advanced Finite Element Method Workshop Note-3

Useful links:
FreeFEM website: https://freefem.org/
FreeFEM source code: https://github.com/FreeFem/FreeFem-sources
FreeFEM installation packages: https://github.com/FreeFem/FreeFem-sources/releases
FreeFEM YouTube channel: https://www.youtube.com/channel/UCJlw6LHQt7UWXrH2uzGYZWw

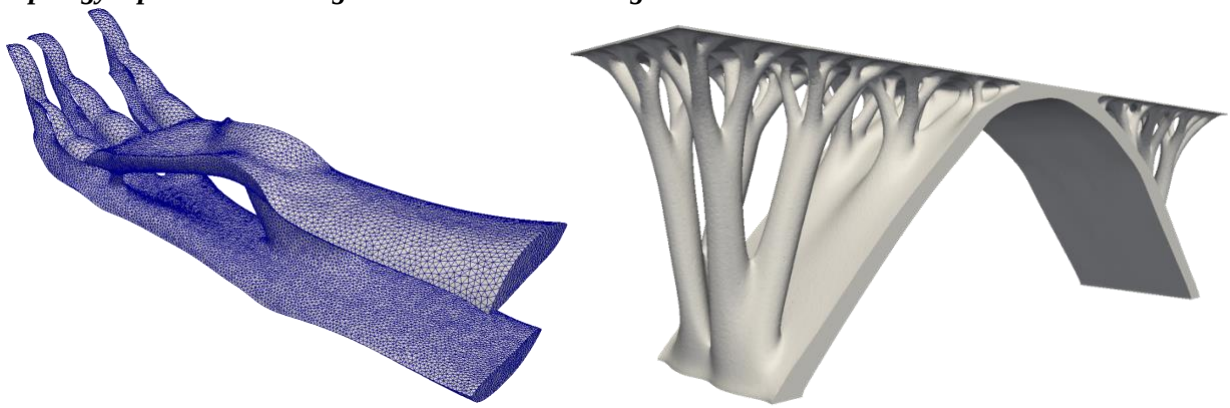
Related Softwares:
Gmsh: http://gmsh.info/
Mmg platform: https://www.mmgtools.org/
PETSc: https://www.mcs.anl.gov/petsc/
Paraview: https://www.paraview.org/

Education Papers:
Level-set method:
Allaire, G., & Pantz, O. (2006). Structural optimization with FreeFem++. Structural and Multidisciplinary Optimization, 32(3), 173-181.
https://link.springer.com/article/10.1007/s00158-006-0017-y

Phase field method:
Kim, C., Mingook, J., Takayuki, Y., Shinji, N., & Jeonghoon, Y. (2020). Freefem++ code for reaction-diffusion equation–based topology optimization: for high-resolution boundary representation using adaptive mesh refinement. Structural and Multidisciplinary Optimization, 62(1), 439-455.
https://link.springer.com/article/10.1007/s00158-020-02498-3

Density method:
Zhu, B., Zhang, X., Li, H., Liang, J., Wang, R., Li, H., & Nishiwaki, S. (2021). An 89-line code for geometrically nonlinear topology optimization written in FreeFEM. Structural and Multidisciplinary Optimization, 63(2), 1015-1027.
https://link.springer.com/article/10.1007/s00158-020-02733-x

Topology Optimization using FreeFEM-PETSc-Mmg:



Li, H., Yamada, T., Jolivet, P., Furuta, K., Kondoh, T., Izui, K., & Nishiwaki, S. (2021). Full-scale 3D structural topology optimization using adaptive mesh refinement based on the level-set method. Finite Elements in Analysis and Design, 194, 103561.
https://www.sciencedirect.com/science/article/pii/S0168874X21000457
https://www.youtube.com/watch?v=6NIZ0QI4RmY&t=368s