Fall 2019:
Computational and Variational Methods for Inverse Problems
GEO 391/CSE 397/ME 397/ORI 397

FEniCS materials

FEniCS is a powerful, open-source suite of tools for automated solution of PDEs using finite elements. Part of the power for FEniCS is the ease with which one can create FE solvers by describing PDEs using weak forms in nearly-mathematical notation. In this class, we will use FEniCS 2019.1.0 from the Python interface. Note that some of the material may not work in previous versions of FEniCS.

A good starting point for new users are the existing tutorials. It is the most up-to-date resource and it will help you get quickly up and running with solving differential equations in FEniCS.

Installation

To install FEniCS via Anaconda run following command:

```
conda create -n fenicsproject -c conda-forge fenics numpy  matplotlib scipy  jupyter
```

which will create an environment called `fenicsproject`, containing `fenics`, `numpy`, `matplotlib`, `scipy`, and `jupyter`. For the full list of installation options and instructions see this page.

Other Resources

- The complete documentation can be found here:
  https://fenicsproject.org/olddocs/dolfin/2019.1.0/python/
- FEniCS Q&A forum:
  https://fenicsproject.org/qa/
- You can also download FEniCS book, which covers both mathematical background and use of FEniCS:
  https://launchpadlibrarian.net/83776282/fenics-book-2011-10-27-final.pdf
  or check out FEniCS course:
  https://fenicsproject.org/pub/course/lectures/2017-nordic-phdcourse/
  But be aware that these materials are based on older versions of the library!
- If you used a different version of FEniCS in the past, see what's changed here:
  https://fenicsproject.org/docs/dolfin/dev/python/ChangeLog.html