Using CoFI to experiment with geophysical inversions

An Interactive InLab Show and Tell

InLab

inlab.au

Background

In the same way as exploration itself is about possibilities and identifying them, so is finding an inference method that extracts the maximum amount of the right information from the data. Unfortunately, existing inversion frameworks seldom allow for this level of experimentation.

CoFI, InLab's Common Framework for Inference (www.inlab.au/cofi), thus seeks to facilitate experimentation while reducing development time and cost; once an inference problem has been defined in CoFI, trialling a different approach is achieved by simply changing the keywords specifying the inference methodology.

https://cofi.readthedocs.io/en/latest/

Scope of the show and tell

The purpose of this informal show and tell is to provide a hands-on introduction to CoFI, illustrated through interactive problem solving. After introducing key concepts of CoFI, attendees will have the opportunity to work through tutorials and explore:

- How, once a problem is defined in CoFI, they can easily switch between fundamentally different methods to solve an inverse problem with minimal effort,
- How CoFI allows experimentation with different forms of regularisation, prior information, and how these affect solutions and their uncertainty; and
- How the InLab explorer allows to obtain an overview of the capabilities captured in InLab's emerging geodata inference software ecosystem.
  https://inlab.au/inlab-explorer/

Who should attend?

Our vision for CoFI is one of a findable, accessible, interoperable, and reusable community-driven inference framework, where the addition of capabilities by the geoscience community is motivated by domain-relevant examples and enabled by the infrastructure we have set in place.

Thus, the event is targeting attendees who:

- are interested in refreshing their knowledge about, or have an interest exploring the more fundamental aspects of, inverse problems,
- are keen to see a guided tour through a subset of interactive examples illustrating CoFI; and
- are eager to help shape the future of CoFI.

What to bring?

A laptop that can connect to the Internet via WiFI and ideally some familiarity with Python and Jupyter notebooks.