Respy

June 20, 2018

What’s In It for You?

- You can use it as a learning tool
- You can use it for your own work
- It can save you months of work!
  - Clean and robust solutions to many problems you find in any serious econometric project
  - Nice interface, refined over years

Outline

1. What is Respy?
2. Quick Tutorial
3. Software Engineering

What is Respy?

What Is Respy?

- Python program to estimate and simulate a structural model of labor market choices and human capital accumulation
- Under the hood: High performance Fortran code
- Models are easy to specify, without touching the code
- Well tested and used for several papers

Why Is There No Stata Command for Life-Cycle Models?

- Stata is too slow
- Stata syntax makes it hard to specify complicated models
- Every project is different and requires specific computational tricks to become feasible
  - You will have to program yourself!
- But you don’t have to reinvent the wheel
- Respy can be a good starting point

Why Is Simulation So Important?

- Learn about the model
- Verify correctness of the code
- Simulation based estimation methods
- One of the main goals of structural estimation is simulation of counterfactual policies

Where to Find Respy

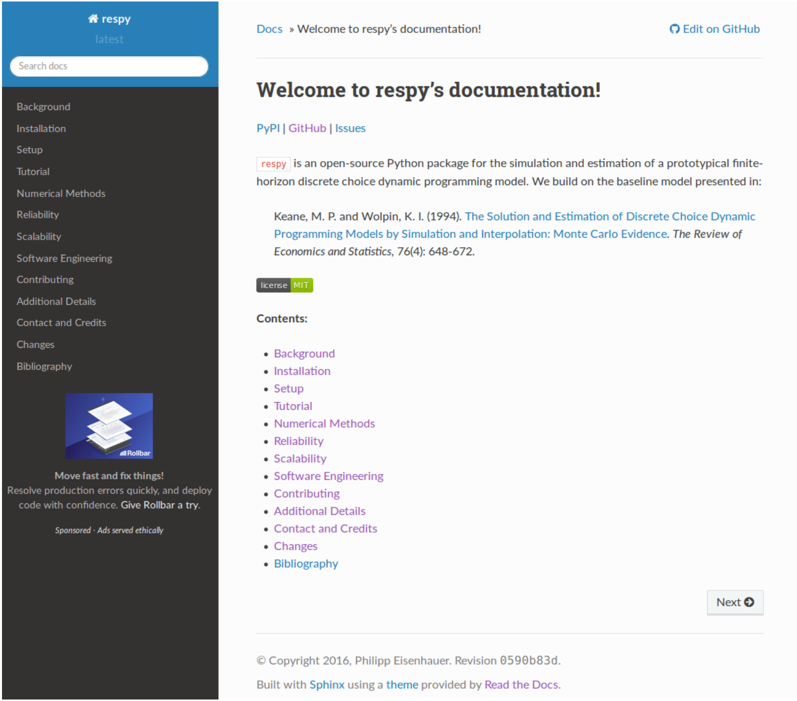
Source Code:

- https://github.com/OpenSourceEconomics/respy/tree/master/respy

Documentation:

- https://respy.readthedocs.io/en/latest/

Quick Tutorial



Welcome to respy's documentation!

PyPI | GitHub | Issues

`respy` is an open-source Python package for the simulation and estimation of a prototypical finite-horizon discrete choice dynamic programming model. We build on the baseline model presented in:

> Keane, M. P. and Wolpin, K. I. (1994). The Solution and Estimation of Discrete Choice Dynamic Programming Models by Simulation and Interpolation: Monte Carlo Evidence. *The Review of Economics and Statistics*, 76(4): 648-672.

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Next

Built with Sphinx using a theme provided by Read the Docs.

Software Engineering

What is Software Engineering?

- Strategies to handle complexity and avoid bugs in large software projects
- You don’t need it if your project consists of one short do-file
- Below, I’ll mention two principles; you can find more in the documentation

Testing

- Respy has thousands of lines of code
- It’s easy to introduce a bug . . .

  . . . and hard to find it afterwards!
- Thats why we have tests at different levels
  - Regression tests
  - Integration tests
  - Unit tests
  - . . .

Modularity

- Respy uses pre-existing code for many tasks
  - Numerical optimization
  - Numerical integration
  - Linear algebra
- Advantages
  - Less code to maintain
  - Highly optimized routines
  - Easy to switch out parts

Modularity II

- The switching out part is extremely important!
  - Projects evolve and goals change
  - At the beginning it’s unknown where changes will be
- Isolate code for each task even for the code you write yourself!
  - Solution, Estimation, . . .
- A well written paper is also modular!