ARNAV SOOD

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EMPLOYMENT HISTORY

Predoctoral Researcher, **University of British Columbia**   Jun. 2018 — Jun. 2020
Advisor: Prof. Jesse Perla

Lead Developer, **QuantEcon**   Jan. 2019 — Present
References: Prof. John Stachurski, Dr. Matt McKay, Dr. Chase Coleman

Research Assistant, **Prof. Laura Veldkamp**   May. 2016 — Jan. 2018

EDUCATION

University of British Columbia   Jun. 2018 — Jun. 2020
Selected Courses (MS and BA.)

New York University   Sep. 2014 — May 2018
Bachelor of Arts (Math.)
Minors in Economics, Philosophy

PUBLICATIONS

Exploiting Symmetry in High-Dimensional Dynamic Programming   In-Progress
(with Jesse Perla, Mahdi Kahou, Jesús Fernández-Villaverde)

We provide a new method for solving high-dimensional dynamic programming problems, and recursive competitive equilibria with a very large (but finite) number of heterogenous agents. The "curse of dimensionality" is avoided due to three complementary techniques: (1) exploiting symmetry in the approximate law of motion and the value function when designing deep learning approximations; (2) constructing a concentration of measure to calculate high-dimensional expectations using only a *single* Monte-Carlo draw for all idiosyncratic shocks; and (3) sampling methods to ensure the model fits along manifolds of interest.

RESEARCH ASSISTANT PUBLICATIONS

Equilibrium Technology Diffusion, Trade, and Growth   Jesse Perla

- Co-wrote Julia code which solves a forward-looking differential system in steady-state, and computes transition dynamics in response to shocks.

Knowledge Diffusion Simulations   Jesse Perla

- Wrote Julia code to solve ensembles of high-dimensional jump diffusion problems and track evolution of moments.

A Model of Product Awareness and Industry Life Cycles   Jesse Perla

- Provided general assistance with Julia code.

Limited Liability as a Financial Friction   Jesse Perla

- Worked on numerical solution of the equilibrium path in Julia, and getting the software ready for publication.

Taking Orders and Taking Notes:
Dealer Information Sharing in Financial Markets   Laura Veldkamp

- Calculated equilibria and bounds for various model cases.

Long-Run Growth of Financial Technology   Laura Veldkamp

- Calculated various limiting facts about the economy.

Germs, Social Networks, and Growth   Laura Veldkamp

- Implemented the network's endogenous transition process in Julia, with caching of relevant state variables.

SOFTWARE

QuantEcon Julia Lectures

- Wrote new lectures, overhauled code, deployed to cloud backends, and supervised RAs.

QuantEcon/Expectations.jl

- Uses Gaussian quadrature to take expectations for increased clarity, speed, and accuracy.

QuantEcon/InstantiateFromURL.jl

- Allows Julia Jupyter notebooks to run anywhere with proper package versions. Used in QuantEcon lectures.

VSE Syzygy JupyterHub

- Worked with Dr. Ian Allison of PIMS to maintain a JupyterHub server for faculty and student use. Deployed from Docker for reproducible setup.

TALKS AND POSTERS

Dependency-Aware Jupyter Notebooks   JuliaCon 2020

Extending Distributions with Expectations.jl   JuliaCon 2020

TEACHING

University of British Columbia   Jun. 2018 — Jun. 2020
Guest Lecturer, ECON 622 (2019) and ECON 628 (2018)

- Prepared and taught occasional lectures to PhD students on software design in Julia.

- Helped students with assignment difficulties.