

QuantNet 2.0 @ GitHub

Lukas Borke and Daniel Neuhoff

Humboldt-Universität zu Berlin

CRC 649

November 2015

Outline

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Practice

GitHub and QuantNet 2.0

GitHub

Demonstration

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Practice

GitHub and QuantNet 2.0

GitHub

Demonstration

Reversible Jump MCMC

Standard practice for approximation of posterior distributions for model parameters: Metropolis-Hastings samplers

Problem: Want to analyze posterior distribution also spanning model space

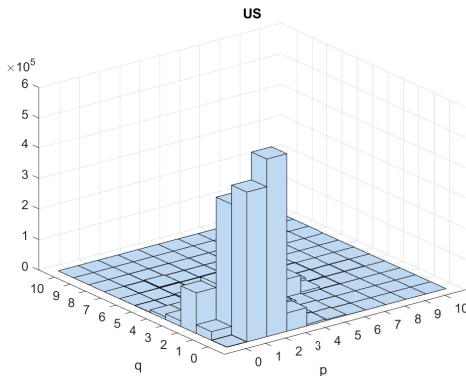
⇒ Dimensionality of parameter space varies

Solution: Reversible Jump Markov Chain Monte Carlo

- ▶ Generalization of Metropolis-Hastings samplers
- ▶ Samples from a joint posterior distribution across different models and their corresponding parameter spaces

Posterior Distribution Across Models

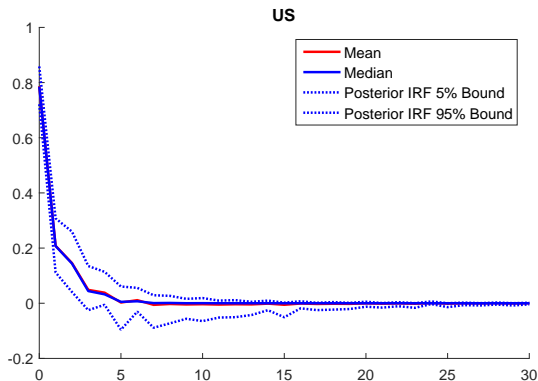
Posterior distribution across ARMA(p,q) models:



\Rightarrow Posterior model probabilities

Posterior Distribution: Impulse Responses

Can analyze posterior distribution for any statistic while accounting for model uncertainty!



Reversible Jump Markov Chain Monte Carlo

Modern Scientific Practice

GitHub and QuantNet 2.0

GitHub

Demonstration

Modern Scientific Practice

Modern scientific practice:

- ▶ Transparency
- ▶ Reproducibility

Also: Want to publicize new technologies!

Problem: Need and want to publish our technologies and data!

Reversible Jump Markov Chain Monte Carlo

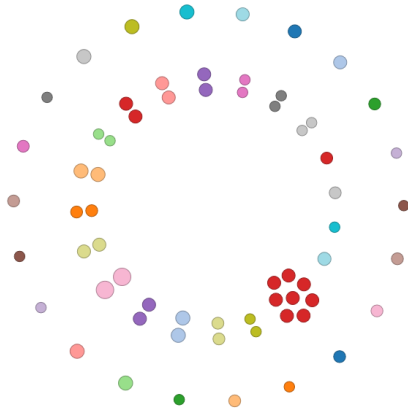
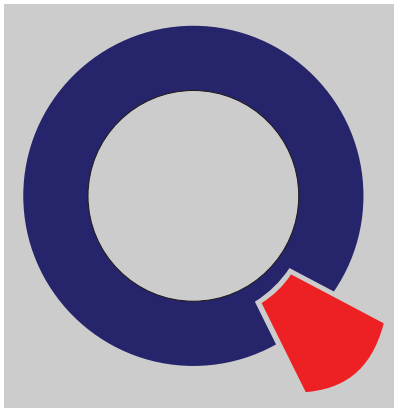
Modern Scientific Practice

GitHub and QuantNet 2.0

GitHub

Demonstration

QuantNet 2.0



The Solution

QuantNet 2.0 - The Next Generation

- ▶ \approx 2000 Quantlets
- ▶ Technology to easily share data and programs
- ▶ Searchable technology
- ▶ Enabled collaboration via seamless GitHub integration
- ▶ Connections between technologies

Boosting transparent and reproducible science

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Practice

GitHub and QuantNet 2.0

GitHub

Demonstration

What is GitHub?



- ▶ A distributed version control system (Git)
- ▶ A collaboration platform (Hub)



Advantages of QuantNet 2.0

- ▶ Fully integrated with GitHub
- ▶ Proprietary GitHub-R-API developed from core package (Arizona State University)
- ▶ Ease of discovery and use of your technology
- ▶ Audit of your technology

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Practice

GitHub and QuantNet 2.0

GitHub

Demonstration

What I did

1. **Start:** Create GitHub repository with own code
2. **Develop:** Develop according to style guide
3. **Publish:** Audit and publish

Your Technology: Easily found, used, and improved!

Interactive D3 Visualization

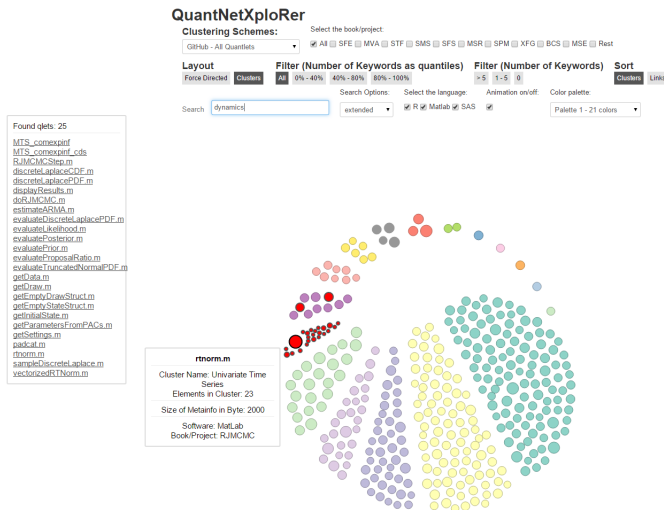


Figure 1. All Quantlets from GitHub in QuantNetXploRer, search term “dynamics”

Collaboration Timeline via GitHub-API

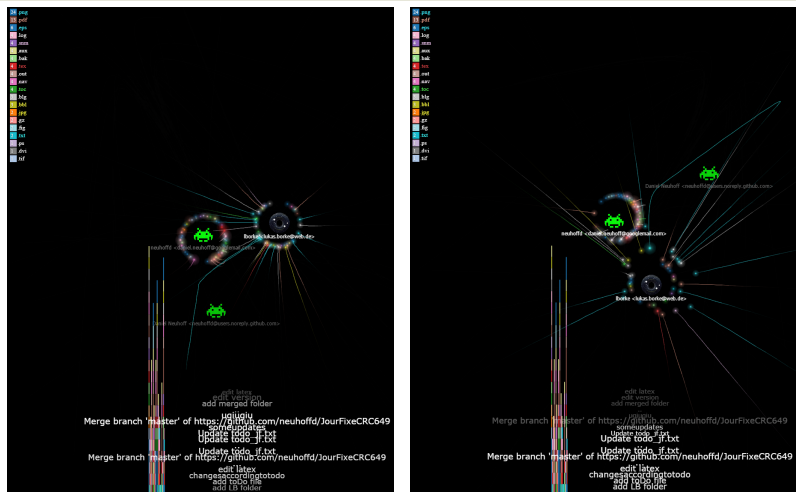


Figure 2. Snapshots of the development of this presentation

More examples of collaboration projects

Thank you for your attention!