

# QuantNet 2.0 @ GitHub

Daniel Neuhoff

Humboldt-Universität zu Berlin

CRC 649

November 2015

# Outline

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Paradigm

QuantNet 2.0

GitHub

GitHub and QuantNet 2.0

# Reversible Jump Markov Chain Monte Carlo

Modern Scientific Paradigm

QuantNet 2.0

GitHub

GitHub and QuantNet 2.0

# 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

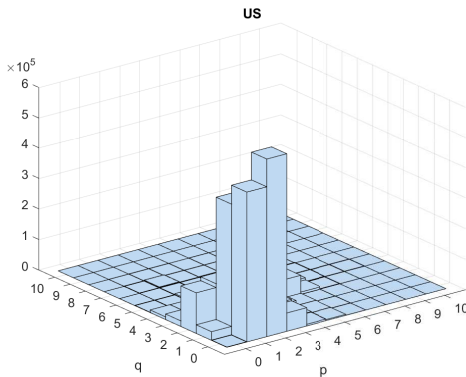
⇒ Dimensionality of parameter space varies

**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

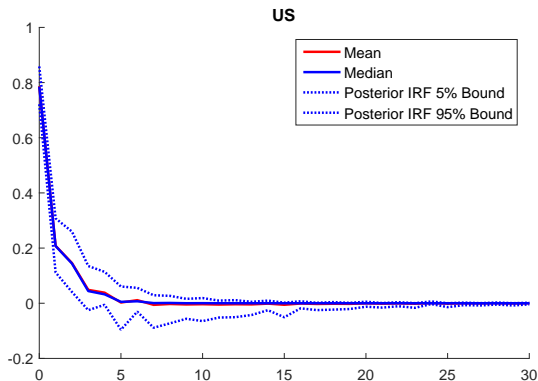
Posterior distribution across ARMA(p,q) models:



$\Rightarrow$  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 Paradigm**

QuantNet 2.0

GitHub

GitHub and QuantNet 2.0

# Modern Scientific Paradigm

Modern scientific practice:

- ▶ Transparency
- ▶ Reproducibility

Also: Want to publicize new technologies!

**Problem:** Need to publish source codes and data!



Reversible Jump Markov Chain Monte Carlo

Modern Scientific Paradigm

**QuantNet 2.0**

GitHub

GitHub and QuantNet 2.0

## QuantNet 2.0



# The Solution

## QuantNet 2.0

- ▶ already hosts more than 1800 Quantlets
- ▶ provides a technology to easily share data and programs
- ▶ provides a platform focused on scientific applications
- ▶ makes technology searchable
- ▶ supports transparency and reproducibility
- ▶ enhances and encourages collaboration through seamless GitHub integration

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Paradigm

QuantNet 2.0

**GitHub**

GitHub and QuantNet 2.0

# GitHub

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

Reversible Jump Markov Chain Monte Carlo

Modern Scientific Paradigm

QuantNet 2.0

GitHub

**GitHub and QuantNet 2.0**

# Advantages

- ▶ QuantNet will be fully integrated with GitHub in the near future
- ▶ It will be easy for other researchers to find and use your technology
- ▶ Your technology is checked by the audit team

# What I did

1. Create GitHub repository
2. Move code into GitHub repository
3. Develop with an eye on style guidelines
4. Write readme.md
5. Write metadata.txt
6. Declare running version ready for audit

After the audit is complete, the end product on the QuantNet 2.0 page



**Thank you for your attention!**