A Generalized Model for Peer Review: Design and Implementation

Xiang Gao

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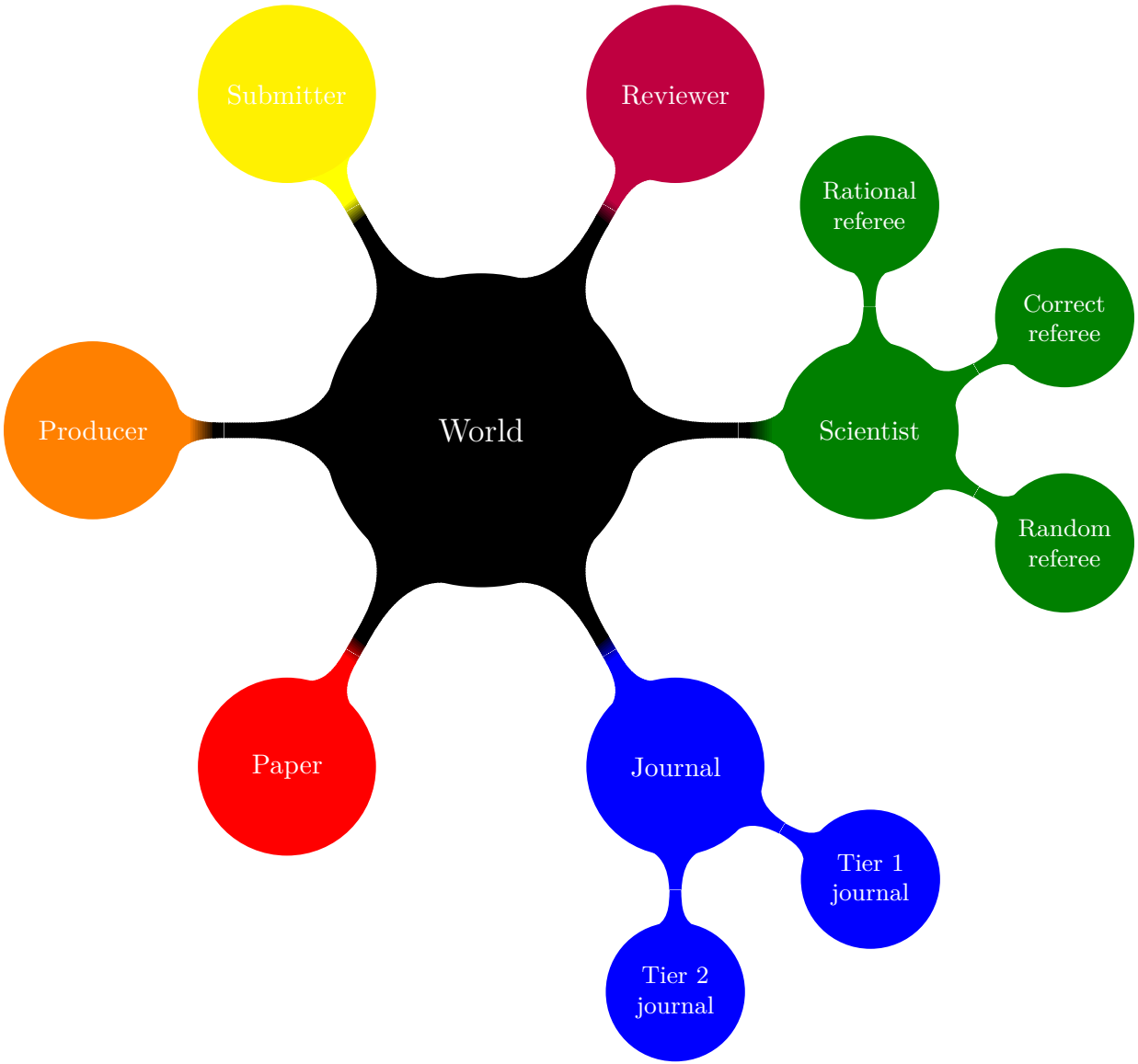
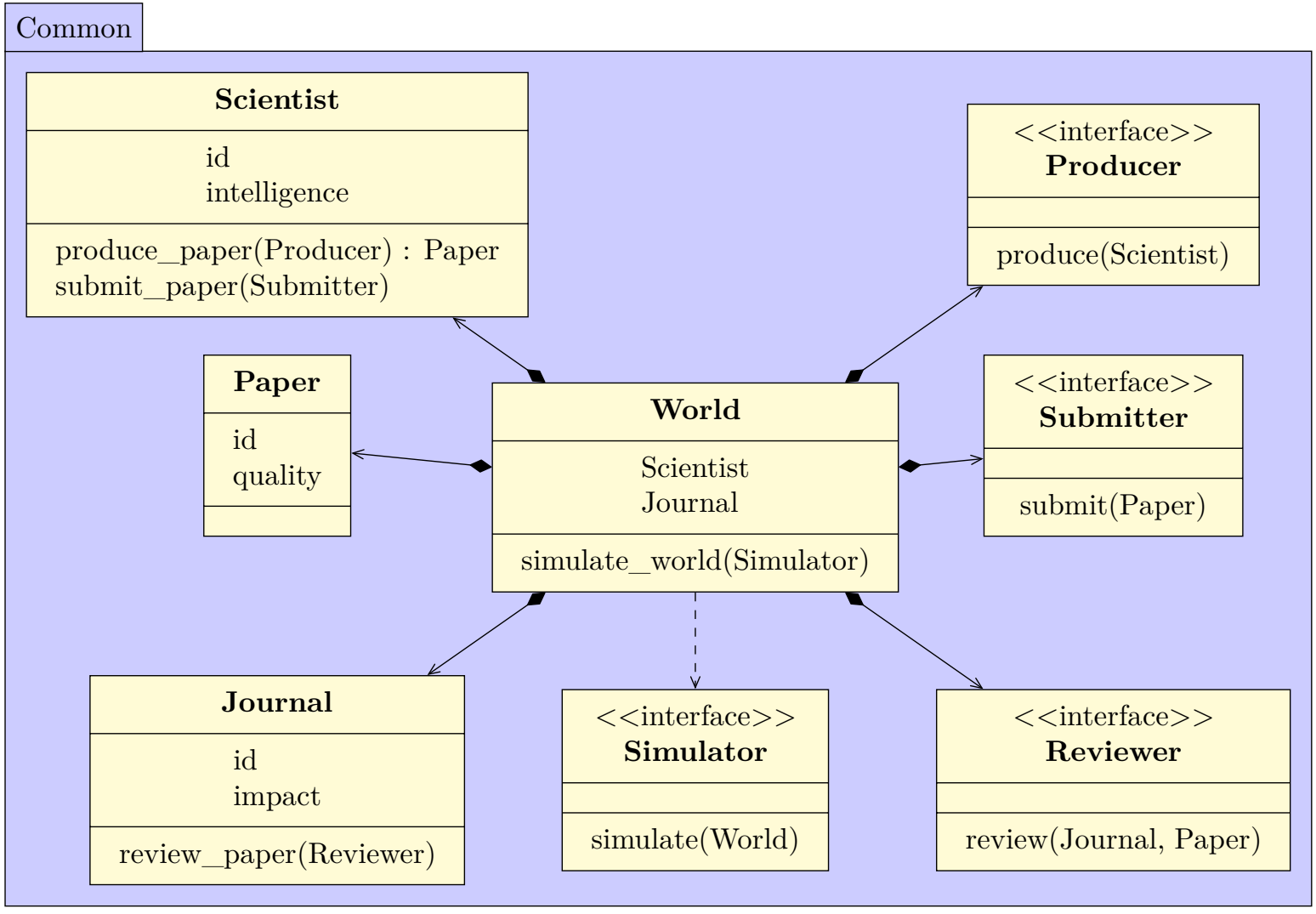
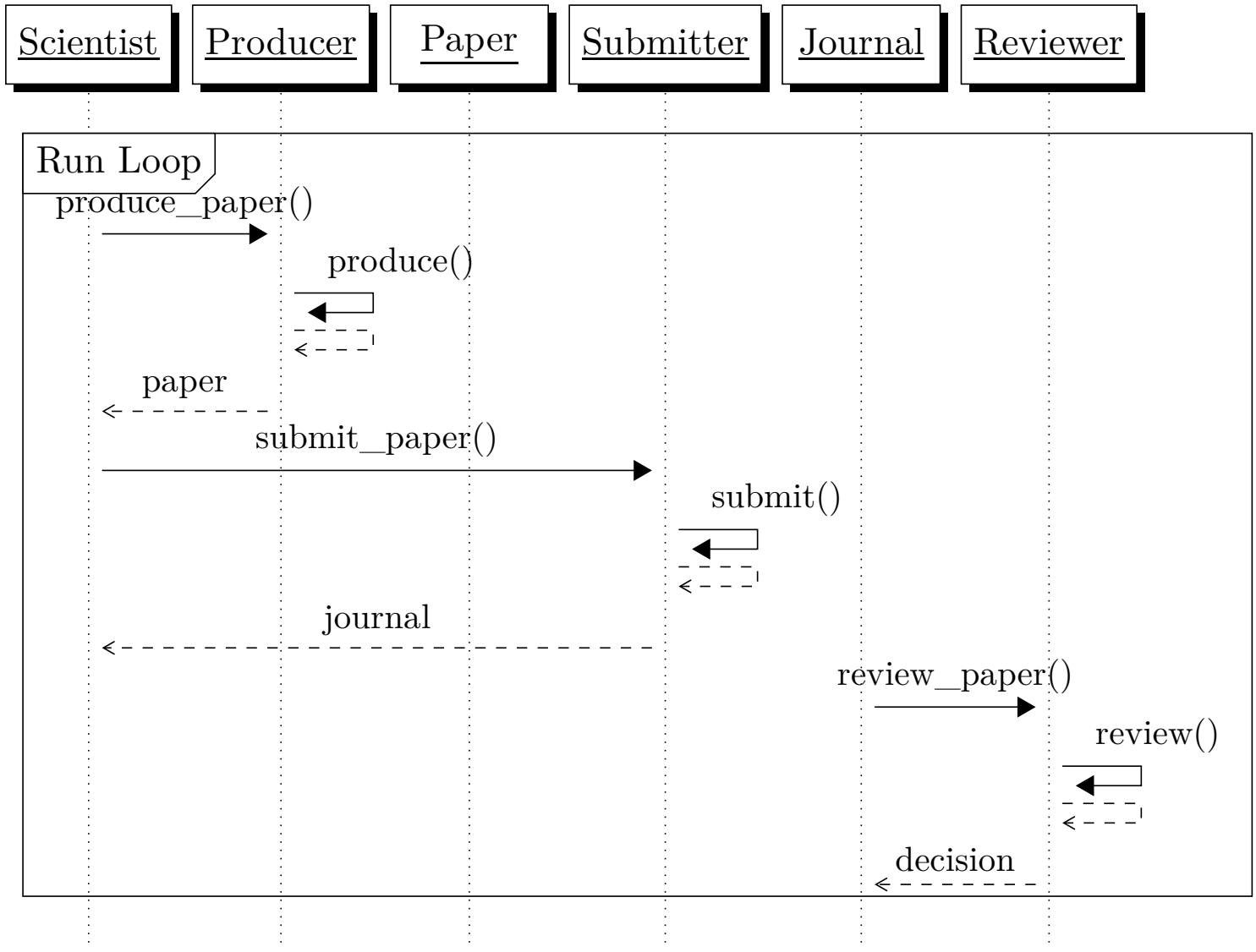
Six Building Blocks for Modeling Peer Review



Class Design



Work Flow


Scientist
Producer
Paper
Submitter
Journal
Reviewer
Run Loop
produce_paper()
produce()
paper
submit_paper()
submit()
journal
review_paper()
review()
decision

Code Style

- Objected-oriented for extendibility.
- Comment to generate help doc.
- Parallel for simulation.

Thurner's Model: Introduction

Model

$$Q_i^{author} \in N(100, \sigma^2) \;\; Q_i^{submit} \in N(Q_i^{author}, \sigma^2_{quality})$$

$$M(t) = \lambda M(t-1) + (1-\lambda)\langle Q_i^{quality}(t-1)\rangle_i$$

$$Q_{min} = M(t) + \alpha std[Q_i^{quality}(t-1)]$$

Thurner's Model: Results and Discussion

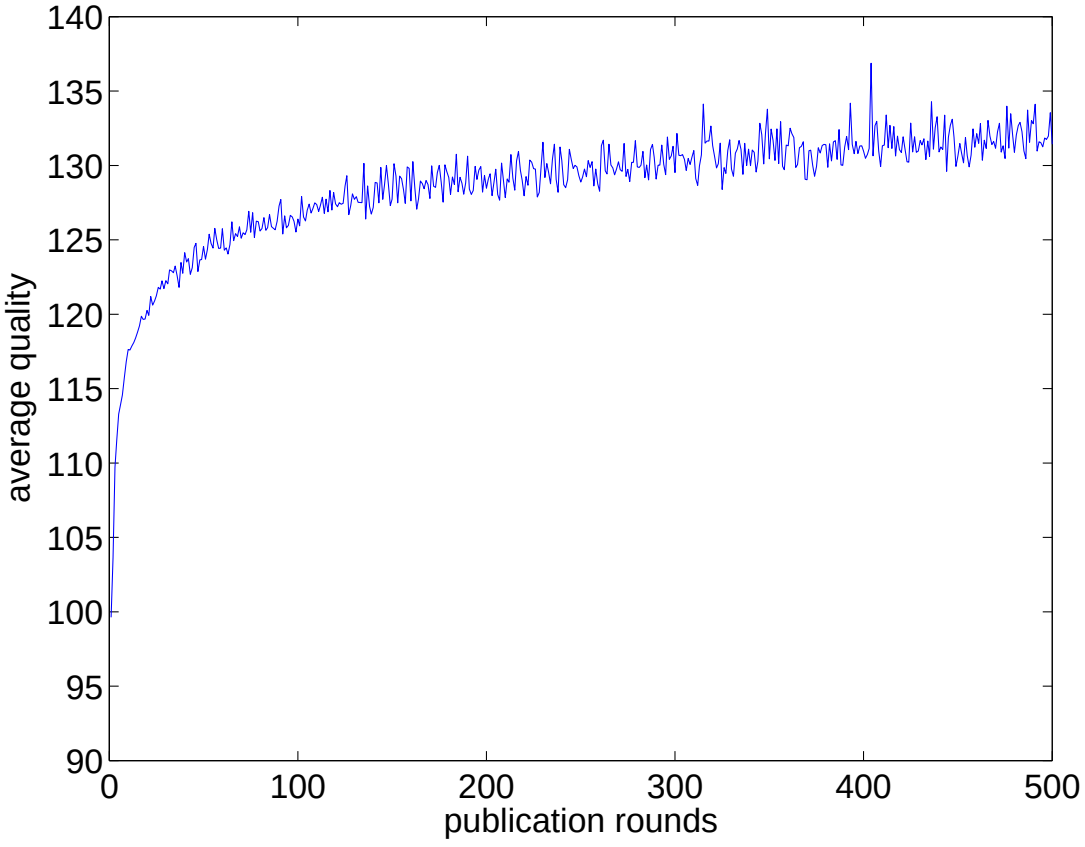


Figure: The average paper quality when all the reviewers are correct ones.

Thurner's Model: Results and Discussion

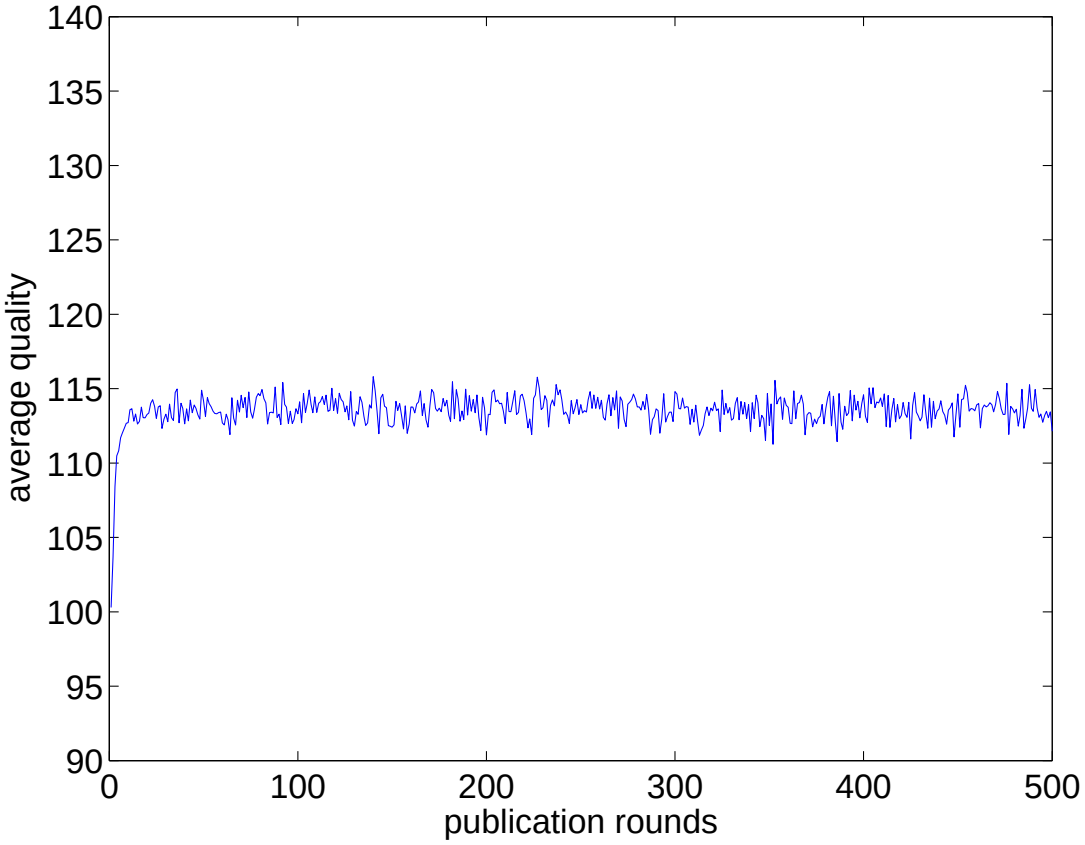


Figure: The average paper quality when 90 percent the reviewers are correct ones and 10 percent are rational.

Thurner's Model: Results and Discussion

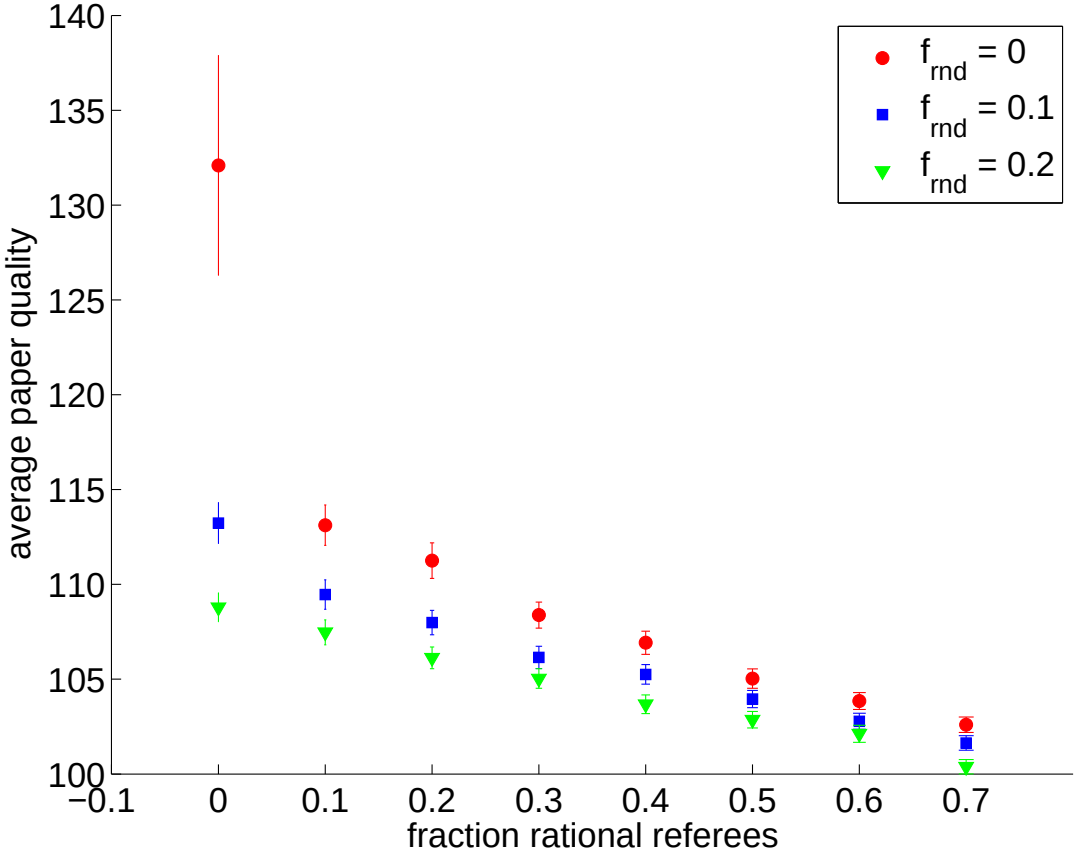


Figure: Comparison of average paper quality when varying the fraction of random reviewers from 0 to 0.2, the fractional of rational reviewers from 0 to 0.7.

Thurner's Model: Results and Discussion

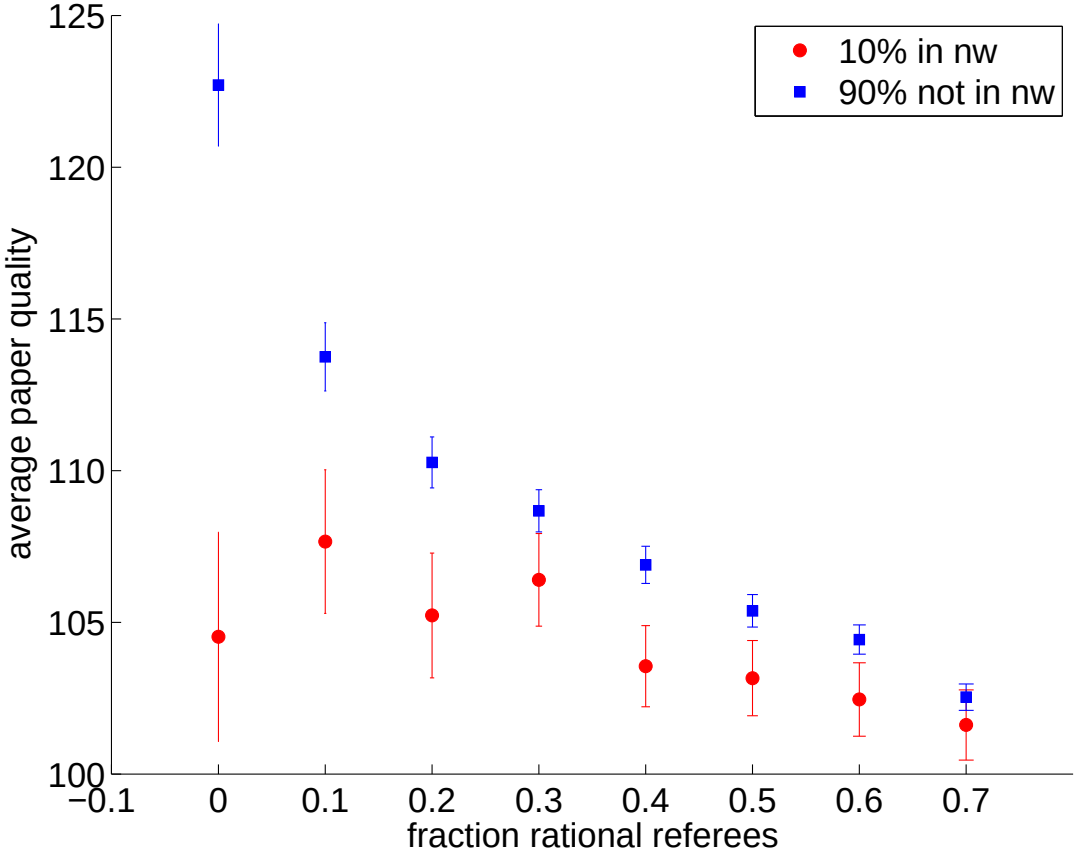


Figure: Comparison of average paper quality of when 10 percent scientists are in network and varying the fractional of rational reviewers from 0 to 0.7.

Thurner's Model: Results and Discussion

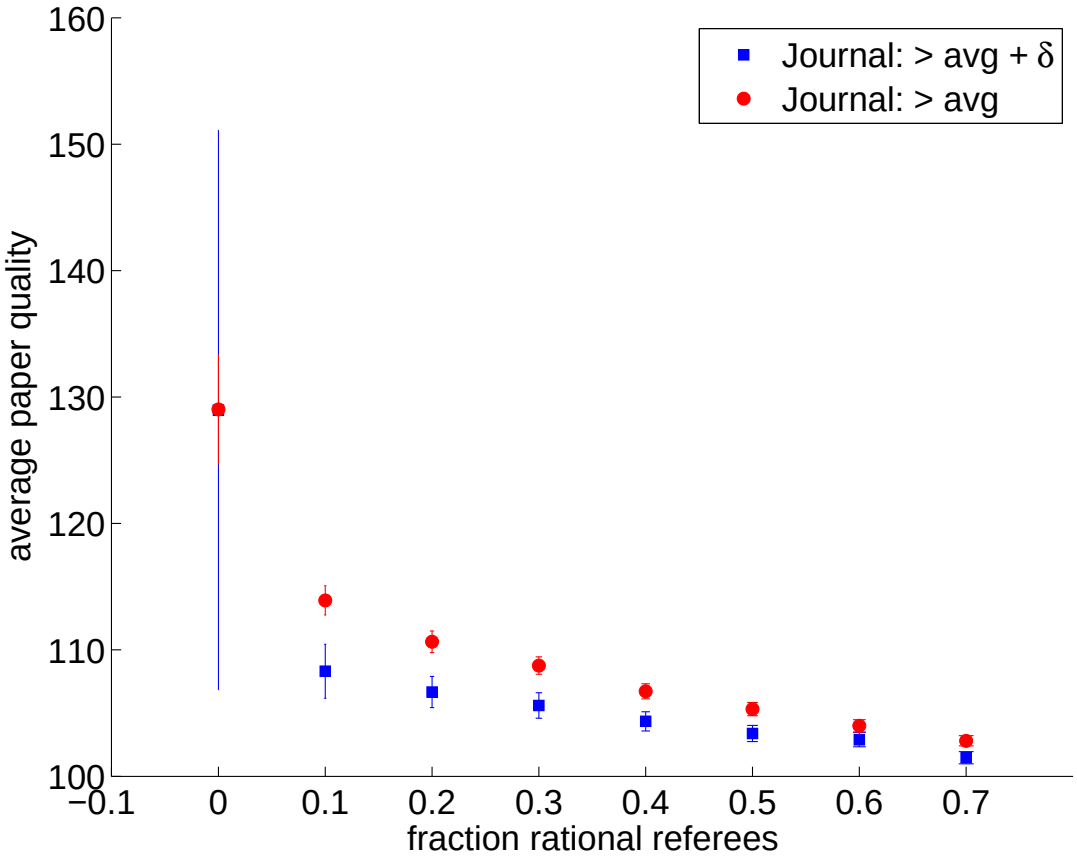


Figure: Effect of journal favors higher quality papers.

Thurner's Model: Results and Discussion

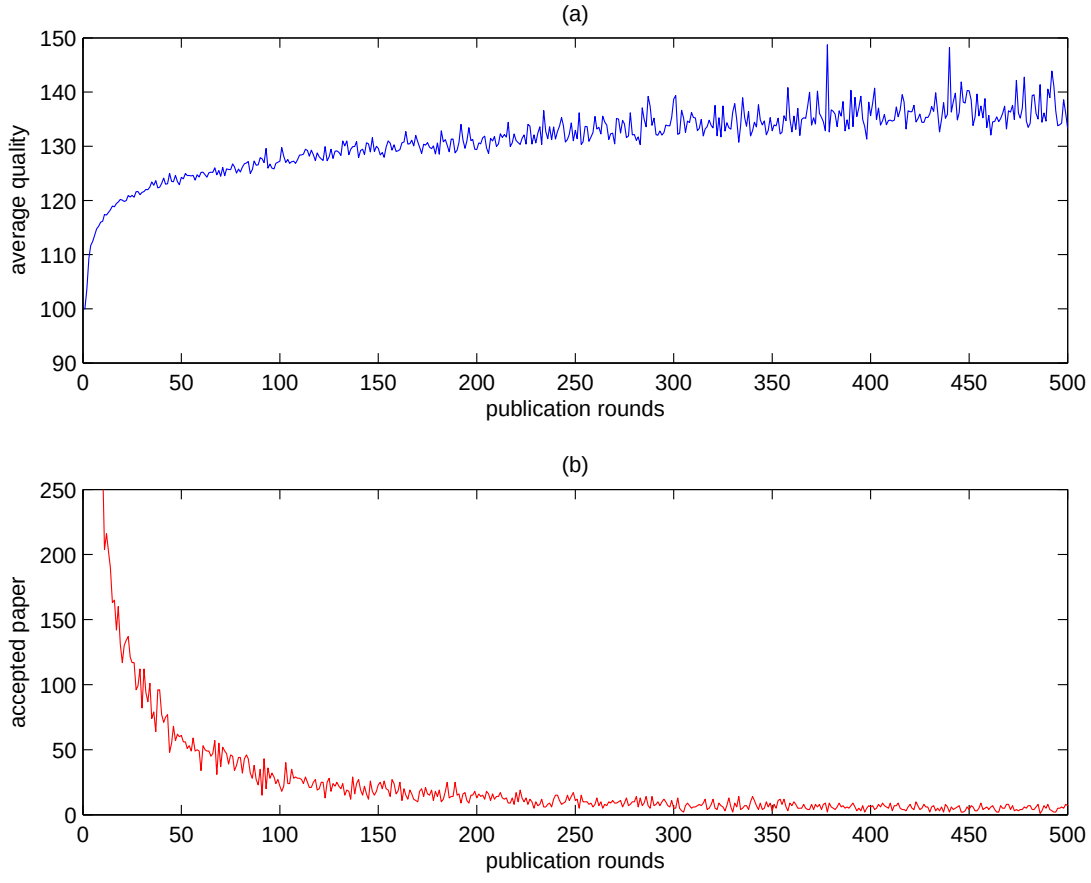


Figure: Average accepted quality vs accepted numbers. The reviewers are all correct ones.

Lessons and Experiences

- Start early.

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- Plan to throw one away.

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- Don't repeat yourself.

Lessons and Experiences

- Start early.
- Plan to throw one away.
- Don't repeat yourself.
- Summary and outlook.