INTRODUCTION

* General importance of stochastic reaction networks
* Define a stochastic reaction network (mass action kinetics)
* Mention SSA and other methods and their limitations (SDM, PPM, tau-leaping, ssSSA)
* Describe what multiscale networks are
* Argue about the importance of having tools for simulating such systems

HYBRID MODELS AND MULTISCALE REACTION NETWORKS

* Introduce PDMP formulation for hybrid models of reaction networks
* Review the framework of Kang et al.

AVERAGING

* Review theoretical results about correctness of averaging
* Introduce Pseudo-Linear part
* Introduce Zero-Deficiency part

ADAPTIVE PDMP

* Describe the algorithm in text-form
* Pseudocode for the algorithm
* Elaborate on copy number bounds
* Elaborate on the adaptation procedure
* Elaborate on the averaging procedure

NUMERICAL EXAMPLES

* Simple example showing adaptation and hybrid model
* Simple example showing averaging
* More complex example showing averaging (e.g. multiple fast subnetworks)
* More complex example showing repeated adaptation (e.g. Repressilator or Toggle Switch)

CONCLUSIONS

* Summarize new contributions
* Describe open issues and possible future directions

APPENDIX

* Classic SSA
* Proof of correctness of the algorithm