

Stochastic Uncertainty Propagation in Power System Dynamics using Measre-valued Proximal Recursions

First Author, *Member, IEEE*, Second Author, *Fellow, OSA*, and Third Author, *Life Fellow, IEEE*

Abstract—The abstract goes here.

Index Terms—Uncertainty propagation, power system dynamics, optimal transport, proximal operator.

I. INTRODUCTION

THIS demo file is intended to serve as a “starter file” for IEEE journal papers Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

II. CONCLUSION

The conclusion goes here.

M. Shell was with the Department of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, 30332 USA e-mail: (see <http://www.michaelshell.org/contact.html>).

A. Halder is with the Department of Applied Mathematics, University of California, Santa Cruz, CA 95064, USA, {ahalder}@ucsc.edu. This research was partially supported by the NSF award 1923278.

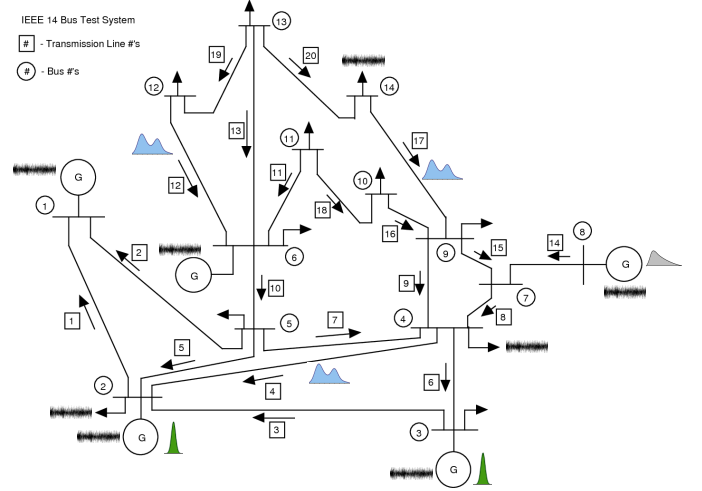


Fig. 1: A schematic of the IEEE 14 bus test system with stochastic uncertainties. The Uncertainty sources may include stochastic forcing and parametric uncertainties at some generators, random variabilities at some loads, and parametric uncertainties along some transmission lines. For depiction purposes, we indicated the parametric uncertainties as PDFs, and stochastic forcing as intermittent signals.

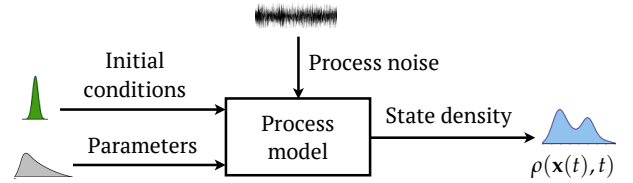


Fig. 2: Block diagram for joint state PDF propagation.

APPENDIX A

PROOF OF THE FIRST ZONKLAR EQUATION

Appendix one text goes here.

APPENDIX B

Appendix two text goes here.

ACKNOWLEDGMENT

REFERENCES

- [1] C. Villani, *Topics in optimal transportation*, No. 58, American Mathematical Society, 2003.

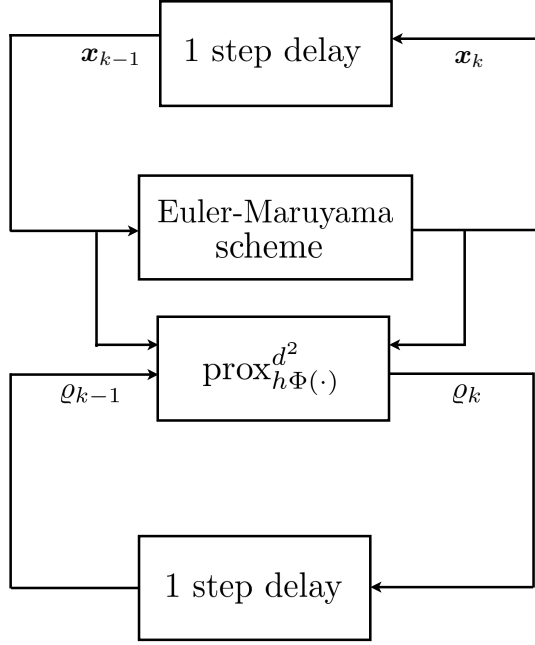


Fig. 3: Schematic of the proposed algorithmic setup for propagating the joint state PDF as probability weighted scattered point cloud $\{\mathbf{x}_k^i, \varrho_k^i\}_{i=1}^N$. The location of the points $\{\mathbf{x}_k^i\}_{i=1}^N$ can be updated by Euler-Maruyama scheme applied to (??); the corresponding probability weights $\{\varrho_k^i\}_{i=1}^N$ can be updated via discrete version of the proximal recursion (??).



Michael Shell Biography text here.



Abhishek Halder (S'10-M'14) is an Assistant Professor in the Department of Applied Mathematics, and is an affiliated faculty in the Department of Electrical and Computer Engineering at University of California, Santa Cruz. Before that he held post-doctoral positions in the Department of Mechanical and Aerospace Engineering at University of California, Irvine, and in the Department of Electrical and Computer Engineering at Texas A&M University. He obtained his Bachelors and Masters from Indian Institute of Technology Kharagpur in 2008, and

Ph.D. from Texas A&M University in 2014, all in Aerospace Engineering. His research interests are in stochastic systems, control and optimization with application focus on large scale cyber-physical systems.