Zheren Ma

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Ph.D. Candidate in ME with expertise in advanced control, scientific programming and data analytics

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EDUCATION

The University of Texas at Austin   *2013-present*
Ph.D. Candidate in Mechanical Engineering, GPA: 4.0/4.0
Publications: 3 IEEE/ASME journal papers, 9 conference papers
Expected Graduation Date: **May 2017**, Advisor: Dongmei Chen

Shanghai Jiao Tong University, China   *2009-2013*
B.S. in Mechanical Engineering, GPA: 3.87/4.0, Rank

SKILLS

- **Programming Languages:** Matlab, C#, WPF, C++, Python, VBA
- **Commercial Softwares:** Simulink, DeltaV, Microsoft Power BI, AutoCAD, NX Unigraphics
- **Research skills:** advanced control, multi-phase flow modeling, time series analysis and prediction, finite difference/volume analysis

INTERN EXPERIENCE

Emerson DeltaV Process Control Intern   *Summer 2015, Summer 2016*

- Developed a C#/WPF Windows Application for automating control performance evaluation for a chemical plant.
- Automated data collection from open platform communication (OPC) server, DeltaV continuous historian, event chronicle SQL Server, DeltaV configuration etc.
- Automated data analysis including top 10 bad control loops identifications, interacting or fighting loops detection, valve diagnostics, operator interference analysis etc.

Singapore Technologies Scholarship Intern   *Summer 2012*

- Implemented an adaptive guidance law using C++ for automated guided vehicle (AGV).

SELECTED RESEARCH PROJECTS

Multi-Phase Gas Kick Modeling and Automation   *9/2015-present*

- Proposed a novel multi-phase flow modeling methodology and hydraulic models for simulating different well control cases including managed pressure drilling (MPD), underbalanced drilling (UBD) and Wait & Weight method.
- Developed a Matlab Application for gas kick simulation that can handle many complexities which occur during a well control incident such as handling multiple kicks from one or several formations, dynamic well control, automated choke control, sudden pump start up/shut off, non-Newtonian drilling fluids, arbitrary wellbore path (including directional and horizontal wells), area discontinuity, etc.

Modeling and Simulation of Vibrations in a Drilling System   *2/2015-5/2015*

- Modeled drill string vibration by using the wave propagation theory and a comprehensive rock-bit interaction model.
- Conducted vibration analysis including bit-bounce, stick-slip and bit whirl.

Control of a Integrated Wind Turbine and Battery System   *6/2014-11/2014*

- Developed an efficient power scheduling approach that applied model predictive control (MPC) to probabilistic wind speed prediction obtained by time-series analysis
- Proposed a real-time active power controller that enhances power reference tracking and optimizes the performances of hybrid system under instantaneously varying wind speed.

Wind Turbine Control During Partial Load Operation   *9/2013-5/2014*

- Proposed an adaptive generator torque controller that improved turbine performances in terms of wind energy harvesting, fatigue loading mitigation, and better robustness against model uncertainties.
- Developed a wind turbine simulator as a Matlab/Simulink Application for controller validation and fatigue analysis.

TEACHING/ RESEARCH EXPERIENCE

- Graduate Research Assistant in Petroleum Engineering *9/2015-present*
- Graduate Research Assistant in Mechanical Engineering *1/2015-5/2015*
- Teaching Assistant of Engineering Computational Methods *9/2013-12/2014*

GRADUATE COURSEWORK

- Time-series modeling/analysis/control
- Advanced vehicle powertrain system
- Convex optimization
- Stochastic systems and control
- Modeling of multi-energy system
- Computational fluid mechanics
- Digital signal processing
- Digital control
- Introduction to modern control
- Optimal control theory
- Multi-variable control system
- Linear system analysis