IOWA STATE UNIVERSITY
Department of Aerospace Engineering

Guest Seminar

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Department of Aerospace Engineering

Iowa State University

September 13, 2018
2:10 to ~ 3:00 p.m.
1235 Howe

Optimal Control of Wave Energy Converters

In this presentation, I will address the control of the wave energy conversion device for maximizing the energy converted from the ocean wave.

The Singular Arc control, which is derived from the optimal control theory, is implemented for the Wave Energy Converter. Since the wave information is required by the controller, the Extended Kalman Filter is implemented for the wave estimation.

The measurements used by the estimator are collected from the sensors on the hull of the Wave Energy Converter. Numerical simulations are conducted on a heaving point absorber Wave Energy Converter. The results show that the proposed estimator has a good estimation of the excitation force. Hence, with the correct knowledge of the excitation force, the developed controller has a good performance in terms of the energy production.

Shangyan Zou received a Bachelor's degree in mechanical engineering from Nanjing Forestry University, Nanjing, China and received an M.S. and Ph.D. in mechanical engineering from the Department of Mechanical Engineering-Engineering Mechanics at Michigan Technological University.

His research interests include the optimal control of wave energy converters and space trajectory optimization.

Dr. Zou comes to Iowa State as a post-doctoral researcher working with associate professor Ossama Abdelkhalik, who recently joined the Department of Aerospace Engineering from Michigan Tech.