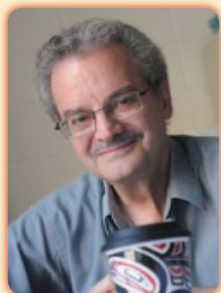


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Robustification of repetitive control systems for high accuracy and high speed operation

Repetitive Control (RC) is a relatively new field that aims to fully cancel the effects of periodic disturbances in a feedback control system, or aims to follow a periodic command perfectly. This is accomplished by looking at the error in the previous period, and adjusting the command given in the feedback control system in the current period. Spacecraft applications include eliminating vibrations of fine pointing equipment, such as in a telescope, produced by rotation of the feedback control actuators, e.g., control moment gyros. Aircraft applications include the repetitive processes in manufacturing that can need high precision, and can benefit from fast operation when possible. RC is very unusual in the control field because it asks for zero error in tracking a periodic signal. RC challenges typical control system analysis methods. Model inaccuracy can easily produce instability. Various methods of robustifying RC to model error are presented.

Biography

Richard W Longman is a Professor of Mechanical and Civil Engineering, Columbia University, and was the Distinguished Romberg Guest Professor, University of Heidelberg, Germany. He received a 50,000 Euro Award for Lifetime Achievement in research from the Alexander von Humboldt Foundation, and the Dirk Brouwer Award from the American Astronautical Society (AAS) for contributions to spaceflight mechanics. He is a Fellow of AAS and AIAA. He served the AAS as Vice President - Publications, VP Technical, First Vice President, and Member of Board of Directors. His PhD is from the University of California, San Diego. He has co-authored approximately 450 publications.

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