

# Digital Twins for Space Robotics Applications

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**Abstract**—A digital twin is a virtual replica of a physical system. It is based on mathematical models of the system, the related algorithms and computer implementations. Robotics generally plays a key role in space exploration. Physical contact and its characteristics are of the utmost importance for the execution of robotic tasks. In this presentation, we will discuss mechanics-based digital twins for robotic contact, particularly in the space operations context for robotic arms and vehicles.

## Short Bio



József Kövecses received the M.S. degree in mechanical engineering from the University of Miskolc, Miskolc, Hungary, in 1989 and the Ph.D. degree in applied mechanics from the Hungarian Academy of Sciences, Budapest, Hungary, in 1994. He was at the Department of Mechanical and Industrial Engineering, University of Toronto, Toronto, Canada, for three years, as a Postdoctoral Fellow, after completing his Ph.D. From 1998 to 2000, he was with Acres International Ltd., Niagara Falls, Canada. From 2000 to 2001, he was with MD Robotics, Brampton, Canada, and then, he was a Research Scientist in dynamics with the Canadian Space Agency, St.-Hubert, Canada, until 2003. He is currently an Associate Professor of mechanical engineering with McGill University, Montréal, Canada, where he is also affiliated with the Centre for Intelligent Machines. He has published numerous papers in leading journals. His research interests include dynamics, control, robotics, and mechatronics. He has significant research and industrial experience in these fields. Dr. Kövecses is a member of both IEEE and ASME.