

Series of ARAS Public Webinars By ARAS Alumni

Cable-Driven Parallel Robots: Control Challenges and Solutions

Invited Speaker



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Mohammad A. Khosravi received M.Sc. from K. N. Toosi University of Technology, Tehran, Iran, in 2000, and the Ph.D. from K. N. Toosi University of Technology, Tehran, Iran, in 2013, all in electrical engineering. He is currently an assistant professor with Amirkabir University of Technology. His research interests lie in the areas of parallel robotics, cable-driven robots, robust control, and nonlinear control theory. Mohamad has a wide background of industrial involvement, and his current research work, the applicability of theoretical advancement in practice, and online implementation issues is highlighted.

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Abstract

In recent decades, the growing need of industry for **high-speed robots** with a **large workspace** has led to the development of **cable-driven parallel robots (CDPR)**. Having significantly lower inertia than the rigid linkage robots makes CDPRs a unique alternative for applications with large workspace requirements and high-speed manipulation demands. However, by cables we may exert only **tensile force** in pulling direction. The positive tensile force of the cables in CDPRs is guaranteed either through a passive force, such as gravity, or using redundant cables in their structure. This challenge motivates the researchers to develop desirable **control algorithms** for a CDPR to maintain positive tension in all the cables while having a suitable tracking performance. This talk addresses the control challenges in CDPRs and discusses some approaches that suitably employed for this class of robots. In particular, the first part of the talk demonstrates the CDPRs **kinematics** and their different types of **workspace** as well as their **dynamics**. The second part of the talk focuses on **control challenges** of the CDPRs and next, some solutions are introduced. At the end, ongoing and **future direction** in the control of the CDPRs will be discussed.

Date & Time

Date: Monday, July 26, 2021 (4 Mordad 1400)
Time: 18:00-19:30 (+4:30 GMT Tehran local time)
9:30-11:30 (-4:00 GMT Canada Eastern Time Zone)

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