

Living machines 2016 19-22 July, Edinburgh, Scotland



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is Professor of Robotics at the University of Pisa, and Senior Scientist at the Italian Institute of Technology in Genoa. He graduated from the University of Bologna in 1988 and was a postdoc scholar at M.I.T. Artificial Intelligence lab in 1988–1990. He teaches Control Systems and Robotics in the Department of Information Engineering (DII) of the University of Pisa, leads the Robotics group at the Research Center "E. Piaggio" of the University of Pisa since 1990, and served as Director from 2003 to 2012. His main research interests are in Robotics, Haptics, and Control Systems in general. He has published more than 300 papers on international journals, books, and refereed conferences. He currently serves as the President of the Italian Association of Researchers in Automatic Control. He has served as Editor in Chief of the Conference Editorial Board for the IEEE Robotics and Automation Society (RAS), as Vice President and as Distinguished Lecturer of IEEE RAS. He is Editor-in-Chief for the book series "Springer Briefs on Control, Automation and Robotics," and is in the editorial board of several scientific journals, including the top-ranked Int. J. Robotics Research, the IEEE Trans. on Robotics and Automation, IEEE Trans. Automation Science and Engineering, and IEEE RAS Magazine. He has organized and co-chaired the first WorldHaptics Conference (2005), and Hybrid Systems: Computation and Control (2007). He is the recipient of several awards and honors. In 2012, he was awarded with an individual Advanced Grant from the European Research Council for his research on human and robot hands.

Abstract:

On the Soft Synergy Model and Its Applications to Artificial Hands.

There is a long history of beautiful and sophisticated artificial hands which had little or no impact on affordable and usable devices for robotics or prosthetics. In an effort to overcome such limitations, it is apparent that simplicity is at a premium, but also that "simple" is not necessarily "easy". Our work in recent years focused on trying to understand what is at the core of human upper limb functionalities, to develop a principled design approach to simplification. Not surprisingly, we found that some principles from human motor control can lead to a better design and control of artificial hands. I will present the main idea we used to enable such simplification, i.e. the notion of "soft synergies", which merges the concepts of motor synergies with an equilibrium-point hypothesis, and recent results in the development of the SoftHand Pro, a prosthetic derivative of the Pisa/IIT SoftHand technology.