When: Tuesday October 4th, 2022 at 4:30PM
Where: Aula Buzano (also streamed on: Zoom)

Michele CUCUZZELLA
Università di Pavia

Krasovskii passivity based control and output consensus

Prof. Como introduces the seminar.

Abstract. In this talk a new passivity concept named Krasovskii passivity will be introduced and novel Krasovskii passivity based control techniques will be presented. Based on Krasovskii passivity, we develop novel dynamic controllers for a class of nonlinear Brayton-Moser systems. The proposed controllers are applicable to a class of systems for which the standard passivity based controllers are not easily applicable. Specifically, we develop two simple control methodologies, called output shaping and input shaping. Finally, an output consensus protocol will be presented for Krasovskii (or shifted) passive nonlinear systems affected by external disturbances. The applicability and effectiveness of the proposed methodologies are illustrated by designing controllers for DC power networks, which are validated by experiments. The talk presents work that has been done jointly (mainly) with Jacquelien Scherpen, Yu Kawano and Krishna Kosaraju.

Bio. Michele Cucuzzella received the M.Sc. degree (Hons.) in Electrical Engineering and the Ph.D. degree in Systems and Control from the University of Pavia, Pavia, Italy, in 2014 and 2018, respectively. Since 2021 he is Assistant Professor of automatic control at the University of Pavia. From 2017 until 2020, he was a Postdoc at the University of Groningen, the Netherlands. From April to June 2016, and from February to March 2017 he was with the Bernoulli Institute of the University of Groningen. His research activities are mainly in the area of nonlinear control with application to the energy domain and smart systems. He has co-authored the book Advanced and Optimization Based Sliding Mode Control: Theory and Applications, SIAM, 2019. He serves as Associate Editor for the European Control Conference since 2018 and received the Certificate of Outstanding Service as Reviewer of the IEEE Control Systems Letters 2019. He also received the 2020 IEEE Transactions on Control Systems Technology Outstanding Paper Award, the IEEE Italy Section Award for the best Ph.D. thesis on new technological challenges in energy and industry, and the SIDRA Award for the best Ph.D. thesis in the field of systems and control engineering. He was also finalist for the EECI Award for the best Ph.D. thesis in Europe in the field of control for complex and heterogeneous systems, and for the IEEE-CSS Italy Best Young Paper Award.