סמינר - SEMINAR

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים **ביום ב' 10.05.2021**
(כ״ח באייר תשפ״א), **בשעה 17:00** באמצעות הזום :**https://technion.zoom.us/j/96410625763**

מרצה:

Dr. Christian Grussler,

Postdoctoral Fellow, the Department of Electrical Engineering and Computer Sciences,
UC Berkeley (until January 2021)
https://sites.google.com/view/christiang/

על הנושא:

Variation Diminishing in Control, Optimization and AI
The seminar will be delivered in English

להלן תקציר ההרצאה:

The concept of variation diminishing, i.e., reduction of number of zero-crossing or local extrema, is an elementary property in system and control, optimization and approximation theory. Surprisingly, while the theory behind this concept has been well-established for many decades, it has barely entered the respected communities. This talk aims at reviewing basic concepts associated with this property and presenting opportunities and challenges towards its use for a unified understanding of system and control theory, optimization and AI.

In particular, in the first part, I will discuss preliminary developments in the certification of the variation diminishing property for the Toeplitz and Hankel operators of finite-dimensional linear time-invariant systems. The results are based on two novel concepts:

i. Second-order cone positivity as a highly applicable convex certificate of input-output positivity.

ii. Compound systems positivity as means to detect and characterise variation diminishing systems.

Applications and visions towards a revisited view of step-response analysis, optimisation as well as harmonic analysis will be discussed.

In the second part, I will briefly outline analogues of this systems viewpoint in approximation theory. To this end, I will talk about problems in the context of sparsity/low-rank constraint, as often found in distributed control applications, compressed sensing, matrix completion, and exemplify the importance of variation diminishing in deep learning based on convolutional neural networks.

Short Bio:
Research Associate, the Control Group, Department of Engineering, University of Cambridge, United Kingdom (Jan. 2018 – Jan. 2020);
 postdoctoral fellow (Mar. 2017 – Dec. 2017); and PhD student (Jan. 2012 – Feb. 2017), both at Department of Automatic Control, Lund University, Sweden.

מארח : פרופ' אולג גנדלמן

בברכה,

פרופ"ח אמני סאו
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