

Kolloquium

Biomedizinische Technik und verwandte Gebiete

Sommersemester 2017

Donnerstag, 19.07.2017, 9:00 – 11:00 Uhr

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(Moderation: Univ.-Prof. Dr.-Ing. Dr. med. Steffen Leonhardt,
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„The Artificial Pancreas – Steps In The Design Of A Medically Inspired Control Algorithm For Day-and-Night Automated Glucose Control“

Abstract:

Control engineering and automation are an integral part of modern life. Automation and control are used constantly to enhance productivity and quality as well as to provide safety and, most importantly, to improve the quality of life. Closed-loop systems and algorithms can be found in home appliances, automobiles, aviation and more. As in other aspects of life, the principals of automation and control can be used in medical devices and in the management of Type 1 Diabetes Mellitus (T1DM). The idea of an algorithmic or technological way to automate glucose control is not new and has been researched for more than four decades. However, improvements in glucose sensing technology, insulin delivery and communication, together with advances in control and systems engineering, has made this dream of an artificial pancreas become possible.

Different attempts are being made to design algorithms for the artificial pancreas; some are targeting overnight control, while others are designed to prevent nocturnal hypoglycemia or overcome meal challenges and exercise based on bi-hormonal or uni-hormonal design.

This talk will provide a step-by-step journey to the design principles of a medically inspired control algorithm for day-and-night automated glucose control. The clinical challenges in automated glucose control will be discussed together with the evolution of an MPC algorithm that can overcome these challenges and provide safe and effective glucose control design, one that can be translated to a medical device.

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