OVERDETERMINED 2D SYSTEMS INVARIANT IN ONE DIRECTION AND THEIR TRANSFER FUNCTIONS

ANDREY MELNIKOV (BEN-GURION UNIVERSITY)

A class of overdertermined 2D systems which are invariant in one direction, is defined. Via separation of variables, a transfer function of the system is obtained. In this talk, I will focus on the class of matrix-valued transfer functions $S(\lambda, t_2)$ which have the following properties: 1. $S(\lambda, t_2)$ is analytic in the neighborhood of $\lambda = \infty$; 2. $S(\lambda, t_2)$ is absolutely continuous as a function of t_2, for each λ; 3. $S(\lambda, t_2)$ maps solutions of a certain linear differential equation (input) with spectral parameter λ to solutions of another one (output).

It turns out that the spectrum of $S(\lambda, t_2)$ is independent of t_2, and as a result, such functions have realization and interpolation theory similar to the classical case. Additionally, classical theorems of Kalman's theory are generalized and proved in this setting (the classical case corresponds to $S(\lambda)$, i.e., a t_2 independent function). Time permitting, I will present the most important and interesting theorems of this theory.