Sergey Belyi

Troy University

A system coupling and Donoghue classes of Herglotz-Nevanlinna functions.

Abstract

We study the impedance functions of conservative L-systems with unbounded main operators. In addition to the generalized Donoghue class $\mathfrak{M}_\kappa$ of Herglotz-Nevanlinna functions considered earlier, we introduce "inverse" generalized Donoghue classes $\mathfrak{M}_\kappa^{-1}$ of functions satisfying a different normalization condition on the generating measure. We establish a connection between "geometrical" properties of two L-systems whose impedance functions belong to the classes $\mathfrak{M}_\kappa$ and $\mathfrak{M}_\kappa^{-1}$, respectively. After that we introduce a coupling of two L-system and show that if the impedance functions of two L-systems belong to the generalized Donoghue classes $\mathfrak{M}_{\kappa_1}(\mathfrak{M}_{\kappa_1}^{-1})$ and $\mathfrak{M}_{\kappa_2}(\mathfrak{M}_{\kappa_2}^{-1})$, then the impedance function of the coupling falls into the class $\mathfrak{M}_{\kappa_1\kappa_2}$. Consequently, we obtain that if an L-system whose impedance function belongs to the standard Donoghue class $\mathfrak{M} = \mathfrak{M}_0$ is coupled with any other L-system, the impedance function of the coupling belongs to $\mathfrak{M}$ (the absorbtion property). Observing the result of coupling of n L-systems as n goes to infinity, we put forward the concept of a limit coupling which leads to the notion of the system attractor, two models of which (in the position and momentum representations) are presented.

The talk is based on joint work with K. A. Makarov and E. Tsekanovskiĭ (see the reference below).

[1] S. Belyi, K. A. Makarov, and E. Tsekanovskiĭ: *A system coupling and Donoghue classes of Herglotz-Nevanlinna functions*, Complex Analysis and Operator Theory, (2016), 10 (4), pp. 835-880.

Talk time: 2016-07-21 04:00 PM— 2016-07-21 04:20 PM
Talk location: Cupples I Room 218