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Room 220, Lady Shaw Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

Seminar

Forman's Ricci curvature and Applications

Dr. Emil Saucan
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Abstract

While not the best known among the discretizations of the classical Ricci curvature, Forman's version is simple and flexible in computations, thus rendering it, and its associated Ricci flow, as an adaptable tool for various applications.

The most direct among such applications is to the fields of Imaging and Graphics, and we present its uses for such tasks as change detection in medical images, detection of man-made objects in aerial images and high dynamic range (HDR) imaging.

We further show that in the limit case of 1-dimensional complexes, i.e. networks (or graphs) this edge-based notion is still powerful and expressive enough to allow us to capture not only local, but also global properties of networks (be they biological, chemical, communication or social), both weighted and unweighted, directed as well as undirected.

Furthermore, we develop a fitting Ricci flow, and we apply it in the analysis of dynamic networks, and employ it to such tasks as change detection and denoising of experimental data, as well as to the extrapolation of network evolvement.

Moreover, we show that using Forman's Ricci curvature, one can study not only the pairwise correlations in networks, but also the higher order ones, that are especially important in biological and social networks, and apply Forman's original notion to the resulting complexes (hyper-networks) together with an adapted Ricci flow.

Date : August 29, 2017 (Friday)
Time : 10:00a.m. – 11:00a.m.
Venue : Room 222, Lady Shaw Building
The Chinese University of Hong Kong

All are Welcome