

On the Minkowski dimensions of multi-dimensional and coupled multiplicative systems

Jung-Chao Ban (National Dong Hwa University, Taiwan)

Abstract:

This talk investigates a multiplicative integer system using a method that was developed for studying pattern generation problems. The entropy and the Minkowski dimensions of general multiplicative systems can thus be computed. A multi-dimensional decoupled system is investigated in three main steps. (I) identify the admissible lattices of the system; (II) compute the density of copies of admissible lattices of the same length, and (III) compute the number of admissible patterns on the admissible lattices. A coupled system can be decoupled by removing the multiplicative relation set and then performing procedures similar to those applied to a decoupled system. The admissible lattices are chosen to be the maximum graphs of different degrees which are mutually independent. The entropy can be obtained after the remaining error term is shown to approach zero as the degree of the admissible lattice tends to infinity.