

Spectral theory of n -fold periodic graphs with applications to toroidal 6-cages, $(3, 6)$ -cages, and $(2, 6)$ -cages

Horst Sachs
TU Ilmenau
Germany

Joint work with
Peter John

Abstract

Toroidal 6-cages (i.e., hexagonal tessellations of the torus, in a chemical context also called toroidal fullerenes) are used as prototypes for outlining a general spectral theory of n -dimensional toroidal graphs derived from some locally finite n -fold periodic graph.

The results are used to calculate explicitly spectra and orthonormal eigenvector systems of toroidal 6-cages, $(3, 6)$ -cages and $(2, 6)$ -cages (a $(q, 6)$ -cage, where $q \in \{2, 3, 4, 5\}$, is a two-connected cubic plane graph that has only q -gons and hexagons as its faces; the graph of an ordinary fullerene is a $(5, 6)$ -cage).