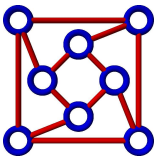

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CHEBYSHEV AND MANHATTAN NOWHERE-ZERO FLOWS

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Nowhere-zero flow is a concept with a motivation in physics, specifically the Kirchhoff's current law in electrical circuits. In graph theory, nowhere-zero flows are related to various helpful properties (e.g. bipartiteness and edge-colourability). An interesting generalisation of nowhere-zero flows considers multi-dimensional flow values. Up to now, such flows have been defined with the Euclidean norm.

In this talk, we present alternative definitions with the Chebyshev and the Manhattan norms, prove and conjecture results such as an upper bound on the flow number and characterisation of graphs with unit vector flows. Then, we discuss their relationship to analogous results for Euclidean flows. Finally, we observe a relationship between Chebyshev flows and a decomposition of a flow into two circulations. They serve a new approach that may lead to proving the widely known Tutte's 5-flow conjecture.