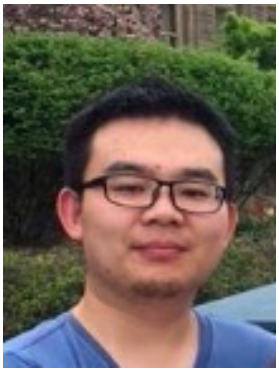
Guangzhou Discrete Mathematics Seminar

From map coloring to nowhere-zero flows



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Room 519, School of Mathematics, Sun Yat-sen University

Planar graphs are vertex 4-colorable, and even 3-colorable if triangle-free. These results are known as 4CT and Grötzsch's 3CT. Is there a better coloring for planar graphs with larger girth? A conjecture of Jaeger states that planar graphs of girth $2k$ are circular $(2+2/k)$-colorable, where the cases $k = 1, 2$ correspond to 4CT and 3CT. We provide partial results for the open cases $k = 4, 6$ and for the more general dual setting of nowhere-zero flows. Dually, Tutte's and Jaeger's flow conjectures predict existence of flows for highly connected graphs, and Lovász, Thomassen, Wu and Zhang (2013) showed that every $6p$-edge-connected graph admits a circular $(2 + 1/p)$-flow. In this talk, we obtain circular $(2 + 2/(2p - 1))$-flow and $(< 2 + 1/p)$-flow for $(6p - 2)$- and $(6p + 2)$-edge-connected graphs, respectively.