Discrete Mathematics Seminar

Time: Friday, 16 October 2009, 1:00–2:00 PM
Location: 238 Derrick Hall
Title: On Shortest Cycle Cover of Cubic Graphs
Speaker: Dr. Xinmin Hou, Mathematics Department, West Virginia University

Abstract:

The shortest cycle cover problem is to find a family of cycles of a graph G that covers every edge of G with the total length as short as possible. It was conjectured by Alon and Tarsi (SIAM 1985) that every bridgeless graph G has a shortest cycle cover with total length at most $\frac{7}{5}|E(G)|$. Pointed out by Jamshy and Tarsi (JCTB 1992) that this conjecture implies the well-known Cycle Double Cover Conjecture (Szekeres 1973, Seymour 1979). It was proved by Jackson (JCTB 1994) that every bridgeless cubic graph with girth at least 7 has a shortest cycle cover of total length at most $\frac{8}{5}|E(G)|$. It is proved in this paper that every bridgeless cubic graph without circuit of length 5 has a shortest cycle cover of total length at most $\frac{8}{5}|E(G)|$. The upper bounds SCC_3 of shortest 3-cycle cover for cubic graphs have been estimated by Alon and Tarsi (SIAM 1985) and Bermond, Jackson, and Jaeger (JCTB 1983) $SCC_3(G) \leq \frac{5}{3}|E(G)|$, by Jackson (JCTB 1994) that $SCC_3(G) \leq \frac{64}{39}|E(G)|$, by Fan (JGT 1994) $SCC_3(G) \leq \frac{44}{27}|E(G)|$, and recently, by Král, Nejedlý, and Šámal that $SCC_3(G) \leq \frac{34}{21}|E(G)|$. It is proved in this paper that $SCC_3(G) \leq \frac{121}{75}|E(G)|$ if all 5-circuits of the graph are disjoint.