University of Mississippi

Combinatorics Seminar

The chain theorem of 4-connected graphs

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3:00 PM–3:50 PM at Hume 331

Chengfu Qin

Guangxi Normal University

ABSTRACT

Let $\mathcal{C} = \{C_n^2 : n \geq 5\}$ and let $\mathcal{L} = \{G : G \text{ is the line graph of an internally 4-connected cubic graph}\}$. A classical result of Martinov states that every 4-connected graph G can be constructed from graphs in $\mathcal{C} \cup \mathcal{L}$ by repeatedly splitting vertices. In this paper we prove that, in fact, G can be constructed from C_5^2 or C_6^2 in the same way, unless G belongs to $\mathcal{C} \cup \mathcal{L}$. Moreover, if G is nonplanar then G can be constructed from C_5^2.

A G is called *critical* if G is internally 4-connected but G/e and $G\backslash e$ are not for all $e \in E(G)$. A result of J. Oxley states there are nineteen operations that reduce G to a *critical* internally 4-connected minor unless G is ladder, möbius ladder, double wheel or terrahawk. We prove that there are ten operations that reduce G to a *critical* internally 4-connected minor unless G is ladder, möbius ladder, double wheel, terrahawk, the line graph of 3-connected cubic graph. Moreover, there are examples show that eight of them are necessary.

This is joint work with Guoli Ding.