**Guangzhou Discrete Mathematics Seminar**

# *Triangle string and an augmentation theorem for vertex-disjoint triangle sets*

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Vertex-disjoint triangle sets (triangle sets for short) have been studied extensively. Many theoretical and computational results have been obtained. While the maximum triangle set problem can be viewed as the generalization of the maximum matching problem, there seems to be no parallel result to Berge's augmenting path characterization on maximum matching [C. Berge, Two theorems in graph theory, Proc. Nat. Acad. Sci. U.S.A. 43 (1957), 842–844]. In this talk, we describe a class of structures called *triangle string*, which is equivalent to the class of union of two triangle sets in a graph. Based on the concept of triangle strings, a sufficient and necessary condition that a triangle set can be augmented is given. We develop an algorithm to test whether a graph $G$ with maximum degree 4 is a triangle string, and if $G$ is a triangle string, we compute a maximum triangle set of it.

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