

# Guangzhou Discrete Mathematics Seminar



## *A strengthening of Erdős-Gallai Theorem and proof of Woodall's Conjecture*

**Binlong Li**

Northwestern Polytechnical University, Xi'an, China

6 January 2021 (Wednesday), 7pm to 8pm

Room 416, School of Mathematics, Sun Yat-sen University

Tencent meeting ID: 320 073 530

For a 2-connected graph  $G$  on  $n$  vertices and two vertices  $x, y \in V(G)$ , we prove that there is an  $(x, y)$ -path of length at least  $k$  if there are at least  $\frac{n-1}{2}$  vertices in  $V(G) \setminus \{x, y\}$  of degree at least  $k$ . This strengthens a well-known theorem due to Erdős and Gallai in 1959. As the first application of this result, we show that a 2-connected graph with  $n$  vertices contains a cycle of length at least  $2k$  if it has at least  $\frac{n}{2} + k$  vertices of degree at least  $k$ . This confirms a 1975 conjecture made by Woodall. As other applications, we obtain some results which generalize previous theorems of Dirac, Erdős-Gallai, Bondy, and Fujisawa et al., present short proofs of the path case of Loebel-Komlós-Sós Conjecture which was verified by Bazgan et al. and of a conjecture of Bondy on longest cycles (for large graphs) which was confirmed by Fraïsse and Fournier, and make progress on a conjecture of Bermond.

This is a joint work with Bo Ning.

**Guangzhou Discrete Mathematics Seminar**

Website <http://www.gzdmseminar.cn>

Mirror site <http://www.cantab.net/users/henry.liu/gzdmseminar.htm>



QR code of the  
seminar series