# Hamiltonian bipartite graphs in dense graphs

Akira Saito

Nihon University, Tokyo, Japan

For a graph $G$, define $\sigma_2(G)$ by

$$\sigma_2(G) = \min\{\deg_G x + \deg_G y \colon x, y \in V(G), x \neq y, xy \notin E(G)\}.$$

If $G$ is a bipartite graph with partite sets $X$ and $Y$, we define $\sigma_{1,1}(G)$ by $\sigma_{1,1}(G) = \min\{\deg_G x + \deg_G y \colon x \in X, y \in Y, xy \notin E(G)\}$. Ore's Theorem says that every graph $G$ of order $n \geq 3$ with $\sigma_2(G) \geq n$ is hamiltonian. For a balanced bipartite graph $G$ of order $2n \geq 4$, Moon and Moser proved that if $\sigma_{1,1}(G) \geq n+1$, then $G$ is hamiltonian. This theorem says that a condition weaker than that of Ore's Theorem guarantees the existence of a hamiltonian cycle in the class of balanced bipartite graphs.

In this talk, we investigate the relationship between Ore's Theorem and The Moon-Moser Theorem. In particular, we observe that, though The Moon-Moser Theorem concerns a smaller class of graphs than Ore's Theorem, it "almost" implies Ore's Theorem.

This is a joint work with G. Chen, S. Chiba, R.G. Gould, X. Gu, M. Tsugaki and T. Yamashita.