1133-05-145 **Jinko Kanno** and **Songling Shan*** (songling.shan@vanderbilt.edu). *Vizing's 2-factor Conjecture Involving Toughness and Maximum Degree Conditions.* Preliminary report.

Let G be a simple graph, and let $\Delta(G)$ and $\chi'(G)$ denote the maximum degree and chromatic index of G, respectively. Vizing proved that $\chi'(G) = \Delta(G)$ or $\Delta(G) + 1$. Define G to be Δ-critical if $\chi'(G) = \Delta + 1$ and $\chi'(H) < \chi'(G)$ for every proper subgraph H of G. In 1968, Vizing conjectured that if G is a Δ-critical graph, then G has a 2-factor. Let G be an n-vertex Δ-critical graph. It was proved that if $\Delta(G) \geq n/2$, then G has a 2-factor; and that if $\Delta(G) \geq 2n/3 + 13$, then G has a hamiltonian cycle, and thus a 2-factor. It is well known that every 2-tough graph with at least three vertices has a 2-factor. We investigate the existence of a 2-factor in a Δ-critical graph under "moderate" given toughness and maximum degree conditions. In particular, we show that if G is an n-vertex Δ-critical graph with toughness at least $3/2$ and with maximum degree at least $n/3$, then G has a 2-factor. In addition, we develop new techniques in proving the existence of 2-factors in graphs. (Received July 21, 2017)