On the Dynamic Coloring of Graphs

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Let G be a graph. A proper vertex coloring of G is said to be a dynamic coloring if for every $v \in V(G)$ of degree at least 2, the neighbors of v receive at least two different colors. The smallest integer k such that G has a dynamic k-coloring is called the dynamic chromatic number of G and is denoted by $\chi_2(G)$. It was conjectured that if G is an r-regular graph, then $\chi_2(G) - \chi(G) \leq 2$. In this talk, we show that the conjecture is true for all bipartite r-regular graphs. Also, we prove that if $G \notin \{C_4, C_5, K_{k,k}\}$ is a srtongly regular graph, then $\chi_2(G) - \chi(G) \leq 1$. Among the other results, it is shown that if G is a graph with $\Delta(G) \geq 3$, then $ch_2(G) \leq \Delta(G) + 1$, where $ch_2(G)$ is the list dynamic chromatic number. This result is a generalization of a theorem due to Lai, Montgomery and Poon which says that if G is a graph with $\Delta(G) \geq 3$, then $\chi_2(G) \leq \Delta(G) + 1$.