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Sogol Jahanbekam* (sogol.jahanbekam@ucdenver.edu), 4203, Student Commons Building, Denver, CO 80204. *On the Strong Chromatic Index of Sparse Graphs.*

The strong chromatic index of a graph G , denoted $\chi'_s(G)$ is the least number of colors needed to edge-color G so that edges at distance at most two receive distinct colors. The strong list chromatic index, denoted $\chi'_{l,s}(G)$, is the least integer k such that if arbitrary lists of size k are assigned to each edge then G can be edge-colored from those lists where edges at distance at most two receive distinct colors. We use the discharging method, the Combinatorial Nullstellensatz, and computation to show that if G is a subcubic planar graph with $\text{girth}(G) \geq 41$ then $\chi'_{l,s}(G) \leq 5$, answering a question of Borodin and Ivanova. We further show that if G is a subcubic planar graph and $\text{girth}(G) \geq 30$, then $\chi'_s(G) \leq 5$, improving a bound from the same paper. Finally, if G is a planar graph with maximum degree at most four and $\text{girth}(G) \geq 28$, then $\chi'_s(G) \leq 7$, improving a more general bound of Wang and Zhao. This paper is a product of the Rocky Mountain - Great Plains Graduate Research Workshop in Combinatorics and is joint work with P. DeOrsey, J. Diemunsch, M. Ferrara, N. Graber, S. G. Hartke, B. Lidicky, L. Nelsen, D. Stolee, and E. Sullivan. (Received September 17, 2015)