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Hemanshu Kaul* (kaul@iit.edu), 10 W 32nd St., Chicago, IL 60616, and **Christodoulos Mitillos** (cmitillo@hawk.iit.edu). *Fall Coloring of Graphs*. Preliminary report.

Fall Coloring of a graph, also called its idomatic partition, asks for a partition of its vertex set into independent sets that are also dominating sets. Unlike typical graph theoretic invariants, the fundamental question is that of existence of such a coloring. Note that any such coloring requires at least chromatic number of colors.

We will construct graphs with arbitrary large difference between their chromatic number and the minimum number of colors in any of their fall colorings, answering a question of Dunbar et al. (2000). We will also give construction of graphs that can be fall colored with many different pre-specified number of colors with arbitrarily large gaps. A sharp sufficient condition on the minimum degree of a graph that guarantees its fall coloring and when a proper coloring is/isn't a fall coloring will be discussed. We will describe the fall colorings for some basic graph classes, graph products, and operators, especially in relation to a conjecture for fall coloring of perfect graphs. (Received August 11, 2015)