

# Product irregularity strength of graphs and hypergraphs

Cory Palmer, University of Montana

(joint work with Jaehoon Kim)

Let  $G$  be a graph with no isolated edges and consider an edge-labeling  $w : E(G) \rightarrow \{1, 2, 3, \dots, s\}$  of the edges of  $G$ . The product degree  $pd(v)$  of a vertex  $v$  is the product of weights on edges incident to  $v$ , i.e.,  $pd(v) = \prod_{e \ni v} w(e)$ . We call an edge-labeling *product-irregular* if all *product degrees* in  $G$  are distinct. The minimal  $s$  such that there exists a product-irregular labeling of  $G$  with labels  $\{1, 2, \dots, s\}$  is the *product irregularity strength* of  $G$ . This parameter was introduced by Anholcer who determined the value for some specific classes of graphs and proved general upper and lower bounds. We establish improved upper and lower bounds on this parameter for graphs. In fact, our results hold for multi-hypergraphs (subject to some basic constraints).