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Minimizing the number of labels for an irreducible $L(2,1)$ -labeling on the Cartesian product of two cycles. Preliminary report.

An $L(2,1)$ -labeling of a graph is a labeling of the vertices using non-negative integers such that adjacent vertices differ in label by at least two and distance two vertices differ in label. An $L(2,1)$ -labeling of a graph is irreducible if reducing the label on any vertex violates an $L(2,1)$ -labeling condition. The invariant icap of a graph is the least number of labels required to create an irreducible $L(2,1)$ -labeling on the graph. We study the icap number of the Cartesian product of two cycles, $C_n \square C_m$. We determine the icap number when $n = 3$ and m is even and when n and m are multiples of five. We determine bounds for other values of m and n . (Received September 20, 2017)