Liar’s Domination of the finite and infinite ladder.

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As introduced by Slater in 2008, liar’s domination provides a way of modeling detection devices, where one may be faulty. Assume that each vertex of a graph $G$ is the possible location for an intruder such as a thief, or a saboteur, a fire in a facility or some possible processor fault in a computer network. A device at a vertex $v$ is assumed to be able to detect the intruder at any vertex in its closed neighborhood $N[v]$ and to identify at which vertex in $N[v]$ the intruder is located. In order to identify any intruder’s location in the graph $G$, a dominating set is needed, and if any one device can fail to detect the intruder, then a double-dominating set is necessary. A liar’s dominating set can identify an intruder’s location even when any one device in the neighborhood of the intruder vertex can lie, that is, any one device in the neighborhood of the intruder vertex can misidentify any vertex in its closed neighborhood as the intruder location. The minimum cardinality of a liar’s dominating set of $G$ is the liar’s domination number of $G$. The liar’s domination number lies between the double and triple domination numbers of a graph because every triple dominating set is a liar’s dominating set, and every liar’s dominating set must double dominate. In this talk, we present the liar’s domination numbers of the finite ladder $P_2 \square P_c$ and infinite ladder $P_2 \square P_\infty$.

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