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Skolem Sequences and Graph Labelling

Skolem sequences were introduced in 1950s and have been used to construct combinatorial designs and to answer set partitioning problems. A Skolem-labeled graph can be assumed as a higher dimensional version of a Skolem sequence and the labelling may be used in testing distance reliability of networks. We survey the known results on graphs Skolem labelling and answer the question of whether a generalized Dutch windmill allows such a labelling. In particular, we show that a Dutch windmill composed of two cycles C_m and C_n , $n \geq m$, with a vertex in common does not have a Skolem labelling if and only if $n - m \equiv 3, 5 \pmod{8}$ and m is odd, and thereby introducing a novel technique for proving that a Skolem labelling does not exist. " Joint work with Nancy Clarke"