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SYMMETRICAL 2-EXTENSIONS OF A 2-DIMENSIONAL GRID. I

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The investigation of symmetrical q-extensions of a d-dimensional cubic grid Λ^d is of interest both for group theory and for graph theory. For small $d \geq 1$ and $q > 1$ (especially for $q = 2$), the study of symmetrical q-extensions of Λ^d is also of interest in connection with molecular crystallography and some phisycal theories. V.I. Trofimov proved that there are only finitely many symmetrical q-extensions of Λ^d for any positive integer d. The aim of the present paper is to find all, up to equivalence, symmetrical 2-extensions of Λ^2. In this paper, which is the first part of our study, we find all, up to equivalence, realizations of symmetrical 2-extensions of Λ^2 for which only trivial automorphism fixes all blocks (we show that there are 87 such realizations). In the second part of the study, we will list the remaining realizations of symmetrical 2-extensions of Λ^2.

Keywords: symmetrical extension of a graph, d-dimensional grid.

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