The fibre bundle formalism has been applied both to the symmetry groups of a physical system and to the energy functional itself. As a result of this procedure additional terms in the energy functional responsible for the symmetries of a physical system have been derived. The explicit form of these terms has been found in the case when the corresponding symmetry group is a rotation group SO(n), a translation group Tn and a Euclidean group which is their semi-direct product. In the case of the discrete subgroups of the Euclidean group (i.e. in the case of the crystallographic groups) the well-known conditions on the potential part in the energy functional have been obtained.

Keywords: FIBRE BUNDLES, ENERGY FUNCTIONAL, EUCLIDEAN GROUP

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The alternation of anionic and cationic layers is characteristic feature of crystal structures of cation-radical salts with high electroconductivity (organic metals). Often symmetry of these layers differs, moreover, they can be described in different space group, that results in difficulties at resolving of crystal structures. We detected the pseudo-symmetry in many organic metals (for example, α-(BETS)BiCl3, k-(BETS)CuCl3, [BETS = bis(ethylendithio-tetrathiafulvalene)]. It has been earlier revealed, that the pseudo-symmetry is characteristic for some crystal structures of fullerene.

Despite of external similarity, C60 and C70 with same reagents frequently do not act similar. Determination of the correct space group is an important first step in any crystal structure determination. Ambiguities in space group selection arising due to lattice pseudo-symmetry, inconsistencies in systematic extinctions, and inconclusive E statistics comprise a source of errors that may lead to incorrect space group assignment and flawed structures. While personal experience and software programs such as CHECKCIF and PLATON can be used for space group verification, caution must be exercised in the usage of such programs and the resulting effects on the crystals structure interpretation.