Tensor distinction of pairs of domain states.

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The properties of multidomain systems depend on the spatial arrangement of domains. Apart from contributions from individual domains also contributions from domains walls should be taken into account. These depend on those tensor components in which the adjoining domains differ and on the orientation of the wall. Calculations with the use of characters of ireps (irreducible representations) of involved symmetries are sufficient to provide an information only about the numbers of independent tensor components. Explicit tensor parameters of a ferroic transition which appear in the first domain of the ferroic state were calculated by Kopský (2001) for all nonmagnetic ferroic transitions with the use of the method of the "*Clebsch-Gordan products*" in terms of "*typical variables*". An extension of these results to magnetic properties and transitions can be performed with the use of "*Opechowski's magic relations*" (Kopský, 2005). In a general case, these parameters are those linear combinations of cartesian tensor components which constitute bases of irreducible representations of parent group – so-called "*covariant components*". The procedure of the "*labelling of covariants* " followed by application of "*conversion equations*" used to transform the results to cartesian tensor components.The same method facilitates the determination of the distinction of tensor properties in pairs of adjoining domains which is further simplified with the use of the concept of the "*twinning group*" of the pair of domain states. In the case of "*completely transposable*" pairs of domain states it is possible to find the distinction in cartesian tensor components almost immediately. In other cases we find first the distinction in terms of covariant components and transform them to cartesian components with the use of conversion equations.

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References:
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