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Partial solvability from dualities: Applications to Ising models in general dimensions and universal geometrical relations S. VAEZI, Z. NUSSINOV, Washington Univ - St. Louis, G. ORTIZ, Indiana Univ - Bloomington — We illustrate that dualities or general series expansion parameter considerations lead to an extensive set of linear constraints that *partially solve* or, equivalently, *localize the computational complexity* associated with numerous systems. As an illustration, we examine both ferromagnetic and spin-glass type Ising models on hypercubic lattices in $D \geq 3$ dimensions and show that, by virtue of dualities alone, the partition functions of these systems can be determined by explicitly computing only $\sim 1/4$ of all coefficients of their high and low temperature series . For the self-dual two-dimensional Ising model, the fraction of requisite coefficients is further halved; all remaining series coefficients are determined by trivial linear combinations of this subset. These relations lead to a large set of non-trivial geometric equalities that hold in all dimensions.

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