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Michael W. Hero, Lauren Kelly Williams and Jeb F. Willenbring* (jw@uwm.edu),
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We provide formulas for polynomial invariants on a tensor product of defining representations of unitary groups, $U(n_1) \times \cdots \times U(n_r)$, when viewed as a real vector space. This situation has a physical interpretation, as it is the quantum analog of an r -particle classical system in which the i -th particle has n_i classical outcomes upon observation. We provide a graphical interpretation of the dimension of the polynomial invariants of a fixed degree. Specifically, we exhibit a bijection between isomorphism classes of m -fold coverings of connected simple graphs and a conjectural basis for the space of degree $2m$ -polynomial invariants. The graph coverings are related to branched coverings of surfaces. (Received February 11, 2010)