1086-22-1175 **Lauren Kelly Williams*** (willia75@uwm.edu), Department of Mathematical Sciences, University of Wisconsin Milwaukee, P.O. Box 0413, Milwaukee, WI 53201. *Invariant polynomial functions on tensors under the action of a product of orthogonal groups.*

We exhibit a stable formula for the dimension of the invariant algebra of degree d homogeneous polynomial functions on $\otimes_{i=1}^{r}\mathbb{C}^{n_i}$ under the action of the product $O_{n_1} \times O_{n_2} \times \cdots \times O_{n_r}$ of orthogonal groups. We provide formulas for these invariants, and establish a bijection between a basis for the invariants and the isomorphism classes of certain edge colored r-regular graphs. The dimension turns out to depend on the number of matchings that commute with a fixed permutation. We determine a formula for this number, and consider its combinatorial interpretations, such as a association to phylogenetic trees. (Received September 19, 2012)