Let $G$ be a compact group acting in a real vector space $V$. We obtain a family of inequalities relating the $L^\infty$ norm of a matrix element of the representation of $G$ with its $L^{2k}$ norm for a positive integer $k$. As an application, we obtain a polynomial time approximation algorithm to find the maximum absolute value of a given multivariate fewnomial (a polynomial with a fixed number of monomials) over the unit sphere (in this case, $G$ is the orthogonal group). This gives a polynomial time approximation algorithm for testing the feasibility of systems of real fewnomial equations. The results extend to the class of polynomials with a fixed dimension of the Newton polytope.