Tuong Ton-That* (tttuong@math.uiowa.edu), Department of Mathematics, 14 MacLean Hall, The University of Iowa, Iowa City, IA 52242-1419, and William H Klink. Decomposition of tensor products of irreducible unitary representations of the unitary group $U(N)$.

Let $G$ denote the unitary group $U(N)$, and $V^{(m)}$ an irreducible $G$-module, where $(m)$ is the signature of the irreducible unitary representation (IRREP) of $G$ on $V^{(m)}$. We give a concrete realization of $V^{(m)}$ and an arbitrary r-fold tensor product of IRREP $V^{(m)}_1 \otimes V^{(m)}_2 \otimes \cdots \otimes V^{(m)}_r$ on a Bargmann-Segal-Fock space, and an explicit decomposition of this tensor product representation into IRREP’s of $G$. We introduce a system of generalized Casimir operators and their spectra to give a resolution of the multiplicity problem in the decomposition. We derive a method of construction of the Gelfand-Cetlin basis for the $G$-module $V^{(m)}$, and as an application of this method we derive a method of computation of Racah and Clebch-Gordan coefficients of $G$. (Received September 06, 2007)