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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 $V^{(m)_1} \otimes V^{(m)_2} \otimes \dots \otimes V^{(m)_r}$ 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)