1077-VJ-2856 **Juhyung Lee*** (`juhylee@math.okstate.edu`), MS438 Oklahoma State University, Stillwater, OK 74078. *A functional equation for a prehomogeneous vector space and unitary representations of $GL(2n, R)$.*

To give a realization of an irreducible unitary representation of $G = GL(2n, \mathbf{R})$, we use the usual G-invariant Hermitian form coming from the standard G-intertwining operator between degenerate principal series representations of parameter s. It is known that the zeta distribution is given by the G-intertwining operator and has a meromorphic continuation to all of $\mathbf{C}$.

The formula for the Fourier transformation of $|\det(x)|^s$, as a distribution, gives a functional equation between the zeta distributions which is known as the Fundamental Theorem of prehomogeneous vector spaces. To show that the Hermitian form is positive definite, we need to extend the functional equation, which is well-known for Schwartz functions, to the larger class of functions in the $\bar{N}$-picture $I(s)$ for a degenerate principal series representation. However, there is no range where both integrals of the functional equation converge (except the $n = 1$ case). Therefore, we extend the notion of the zeta distributions so that the functional equation holds for functions in $I(s)$ as meromorphic functions. The extended functional equation can be applied to construct the inner product on the $I(s)$ explicitly. (Received September 22, 2011)