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Helgason-Fourier Analysis and Sharp Geometric Inequalities on the Rank One Symmetric Spaces

The Hardy-Sobolev-Maz'ya inequality combines the Hardy and Sobolev inequalities into a single inequality on the halfspace. Using conformal equivalence, this inequality is equivalent to the Poincare-Sobolev inequality on the real hyperbolic space. Using Helgason-Fourier analysis, higher order versions of these inequalities were established by G. Lu and Q. Yang for the real and complex hyperbolic spaces. With G. Lu and Q. Yang, we further established these inequalities for the quaternionic and octonionic hyperbolic spaces. In this talk we will present these results and the Fourier analytic tools used in obtaining them.