

**Reproducing Kernels for and Bergman Projections on Harmonic
Besov and Bloch Spaces on the Unit Ball**

Turgay Kaptanoğlu
Bilkent University
Istanbul Analysis Seminars
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We are interested in Besov spaces b_q^p for which $q \in \mathbb{R}$ and $1 \leq p < \infty$, whose members are harmonic functions on the unit ball of \mathbb{R}^n in such a way that their sufficiently high-order derivatives are in Bergman spaces of harmonic functions b_q^p , where $q > -1$. We compute the reproducing kernels of the Besov spaces b_q^2 with $q \leq -1$. The kernels use natural radial fractional derivatives that are suitable for series of zonal harmonics. Using kernels, we define generalized Bergman projections and characterize those that are bounded from Lebesgue classes onto Besov spaces b_q^p .

We also consider the projections onto weighted harmonic Bloch spaces. We obtain various applications of the projections.

This is joint work with A. Ersin Üreyen and Seçil Gergün.