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A Paley-Wiener theorem for eigenfunction expansions

Abstract. We prove a Paley-Wiener theorem for certain eigenfunction expansions which includes Fourier series on compact Lie groups, spherical harmonic expansions, Hermite and Laguerre series. We characterise functions having finite expansions in terms of growth estimates of their holomorphic extensions. We use the holomorphically extended heat kernels to measure the growth.