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## STATISTICAL PROPERTIES OF HIGHER-ORDER LANCZOS DERIVATIVES

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**Abstract of Talk:** The Lanczos derivative, which is a proper extension of the usual derivative, can be derived through a process of least-squares linear regression. By generalizing this least-squares process for polynomials, higher-order Lanczos derivatives can be constructed using the orthogonal Legendre polynomials. Motivated by this least-squares derivation, we also explore the Coefficient of Determination for our polynomials of best fit. Careful study of this quantity, the use of Hilbert-space theory, and Parsevals Theorem produces several results that coincide with well-known properties in regression and main theorems in Fourier analysis.