

# Plancherel-Rotach Asymptotics of Second-Order Difference Equations with Linear Coefficients

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In this talk, we present a complete Plancherel-Rotach asymptotic analysis of polynomials that satisfy a second-order difference equation with linear coefficients. According to the signs of the parameters, we classify the difference equations into six cases and derive explicit asymptotic formulas of the polynomials in the outer and oscillatory regions, respectively. It is remarkable that the zero distributions of the polynomials may locate on the imaginary line or even on a sideways Y-shape curve in some cases. Finally, we apply our results to find asymptotic formulas for associated Hermite and associated Charlier polynomials.