

From numerical quadrature to Padé approximation

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Abstract

The paper reviews the relation between Padé-type approximants of a power series and interpolatory quadrature formulas with free nodes, and that between Padé approximants and Gaussian quadrature methods.

Quadrature methods are well-known. They are used for obtaining an approximate value of a definite integral, and are described in any book of numerical analysis. In this talk, we will show that Padé-type approximants could be interpreted as quadrature formulas with free nodes for the special function $g(x) = 1/(1 - xt)$, and that Padé approximants are, in fact, Gaussian quadratures for the same function g . Thus Kronrod procedure and anti-Gaussian quadrature formulas could be used for estimating their accuracy. Then, Padé approximation for series of functions will be discussed. The talk will end by some perspectives for future researches.