

二元齐次矩阵Padé-型逼近的计算

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Computation of Bivariate Homogeneous Matrix Padé-Type Approximation

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摘要 二元齐次矩阵Padé-型逼近的计算比较复杂, 而通过适当的变量代换, 可以将二元齐次矩阵形式幂级数转化为一元含参数形式的矩阵形式幂级数, 从而给出二元齐次矩阵Padé-型逼近构造性的定义. 为提高二元齐次矩阵Padé-型逼近的逼近解精度, 借助于误差公式推导出基于矩阵 E_{MN} 的二元齐次矩阵正交多项式Padé-型逼近的分子和分母行列式表达式; 为避免计算高阶行列式, 建立了一种 Sylvester-型递推算法. 最后, 通过数值算例验证了该算法的有效性.

关键词: Padé-型逼近 矩阵形式幂级数 二元齐次 正交多项式 递推算法

Abstract: With appropriate variable replacement, the bivariate homogeneous matrix formal power series is transformed to univariate matrix formal power series with parameters. The bivariate homogeneous matrix Padé-type approximation was defined. To improve computation accuracy, using an error formula, the numerator and denominator in the determinant expressions of bivariate homogeneous matrix orthogonal polynomial Padé-type approximation are given based on the matrix E_{MN} . A Sylvester-type recursive algorithm is presented to avoid computation of high degree determinants. A numerical example shows effectiveness of the algorithm.

Keywords: Padé-type approximation, matrix formal power series, bivariate homogeneous, orthogonal polynomial, iterative algorithm

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