

# An algorithm for two-variable rational interpolation suitable for matrix manipulations with the evaluation-interpolation method

Katerina Hadjifotinou<sup>1</sup> and Nikos Karampetakis<sup>1</sup>

<sup>1</sup>Aristotle University of Thessaloniki

May 5, 2020

## Abstract

An algorithm for two-variable rational interpolation is developed. The algorithm is suitable for interpolation cases where neither the number of interpolation points to be used nor the final degrees of the rational interpolant are known a priori. Instead, a maximum degree for the interpolant's numerator and denominator is assumed, and, by testing the condition number of the interpolation system's matrix at each step, the necessary reductions are made so as to cope with non-normality and unattainability occasions. The algorithm can be used for applications of the Evaluation-Interpolation technique in matrix manipulations, such as finding the inverse of a matrix with elements rational functions in two variables. The algorithm avoids completely symbolic calculations, thus keeping the execution time very low even if the system size is large, and achieves accurate function recoveries for greater polynomial degrees than other bivariate rational interpolation methods.

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