

Linear barycentric rational interpolation on two-dimensional starlike domains

Giacomo Elefante

In this thesis we were motivated by the well-conditioning and the fast convergence of barycentric rational interpolation in one dimension and we wanted to extend these properties to higher dimensions.

In the first part of the thesis we introduce a simple yet effective periodic conformal map that allows one to cluster nodes in a precise location in order to achieve a faster convergence when interpolating a smooth periodic function with one (or more) front(s) via a linear barycentric rational trigonometric interpolant.

After that, we prove the logarithmic growth of the Lebesgue constant of the linear barycentric rational trigonometric interpolant for a wide class of nodes, called periodic well-spaced nodes, which includes also equidistant nodes moved with a conformal periodic map.

Finally, we introduce a method for interpolating a function via a tensor product of barycentric rational interpolants in starlike domains inside a Jordan curve; in particular we give a bound for the error of this interpolant and finally we propose a method for approximating the function inside a non-smooth curve.

All these results are illustrated in the last chapter with many numerical examples.

Jury:

Prof. Dr. Jean-Paul Berrut (thesis supervisor)

Prof. Dr. Christian Mazza (internal member of the jury)

Prof. Dr. Richard Baltensperger (examinator)

Prof. Dr. Stefano De Marchi (examinator)

Prof. Dr. Anand Dessai (president of the jury)