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THE QUADRATIC HERMITE-PADÉ APPROXIMATION

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This thesis is concerned with the existence, behaviour and performance of the quadratic Hermite-Padé approximation.

It starts with the definition of the general Hermite-Padé approximation. Some of the problems which arise, particularly those of finding Hermite-Padé forms and the existence of approximations, are discussed. Chapter 3 solves the existence problem in the quadratic case whilst Chapter 2 presents a recurrence algorithm for finding quadratic forms which can easily be extended to general Hermite-Padé forms.

Chapters 4 and 5 compare the performance of the quadratic, Padé and Taylor approximations using particular examples over a variety of regions. Many graphs and contour maps of the various approximations and error functions are given. The quadratic approximation is shown to be superior in these cases.

Finally, in Chapter 6, a theorem concerning sequences of quadratic approximations is presented and the structure of the quadratic table is explored.

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