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Hari V S
Preface

The basic concepts of digital signal processing are taught to the students in engineering and science. The focus of the course is on linear, time invariant systems. The question as to what happens when the system is governed by a quadratic or cubic equation remains unanswered in the vast majority of literature on signal processing. Light has been shed on this problem when John V Mathews and Giovanni L Sicuranza published the book Polynomial Signal Processing. This book opened up an unseen vista of polynomial systems for signal and image processing. The book presented the theory and implementations of both adaptive and non-adaptive FIR and IIR quadratic systems which offer improved performance than conventional linear systems.

The theory of quadratic systems presents a pristine and virgin area of research that offers computationally intensive work. Once the area of research is selected, the next issue is the choice of the software tool to carry out the work. Conventional languages like C and C++ are easily eliminated as they are not interpreted and lack good quality plotting libraries. MATLAB is proved to be very slow and so do SCILAB and Octave. The search for a language for scientific computing that was as fast as C, but with a good quality plotting library, ended up in Python, a distant relative of LISP. It proved to be ideal for scientific computing. An account of the use of Python, its scientific computing package scipy and the plotting library pylab is given in the appendix.