PREFACE

Digital filters are widely used in seismic signal processing, speech processing, image processing, robotics, industrial control etc.. Because of their stability, reliability, and self-programability, these filters are replacing analog filters in many practical applications. Butterworth filter design is attractive, because it is straight forward in pole/zero configuration of the filter transfer function. In the S-plane all the poles lie on a circle centered at the origin of the S-plane and all the zeros lie at infinity. The filter response is smooth and decreasing monotonically with the frequency. However, a large transition region is required between the pass band and stop band. This range can be reduced by designing the filter of higher order. In this dissertation an attempt is made to design, implement and simulate Butterworth first order digital low pass, high pass, band pass and band stop filters.

In the first chapter review of early attempts in developing DSP (Digital signal processing), advantages, limitations and applications of DSP are given. This is followed by a detail account of architectural review of DSP chips. The orientation of the problem is stated at the end of this chapter.

Anatomy of digital filter, filter structures and designing techniques for digital filters have been explained in the second chapter. In the third chapter the Bilinear transform design method, the procedures for designing low pass, high pass, band pass and band stop filters

have been given. A general program in BASIC language is developed for the simulation of these digital filters. System design with μp 8085, algorithm for implementation of digital filters and assembly language, language programs are given in the fourth chapter. Summary and conclusions are included in the fifth chapter. A list of references is given at the end of each chapter.