

Abstract

SHAPE NATURE OF ERROR CONTROL CODES

Adrian Andrew Als

Error control coding refers to the class of signal transformations designed to improve communication performance by enabling the transmitted signals to better withstand the effects of various channel impairments, such as noise, fading, and jamming. The aim of this thesis is to view the process of error correction from a shape perspective to provide an alternative insight to their operation. This shape concept may lead to a new class of error control methodology where the shape property is exploited to firstly, gauge the error-control capability of code structures and secondly, to provide a mechanism by which the performance of the given code structure may be enhanced. In particular we examine the idea of shape in block type codes such as repetition codes, shape codes [1] and the novel Template Based Codes (TBCs). The research also investigates the use of shape in the Viterbi, maximum a posteriori (MAP), and Turbo code decoding algorithms for convolutional codes.