

## CONTENTS

CHAPTER No.	TITLE	PAGE
I	INTRODUCTION TO SPEECH SYNTHESIS .....	
	1.1 History of Speech Synthesis .....	1
	1.2 Applications of Speech Synthesis .....	2
	1.3 Orientation of the Work .....	2
	1.4 Theory of Speech Synthesis .....	3
II	METHODS OF SPEECH SYNTHESIS AND ANALYSIS .....	
	2.1 Natural Speech Analysis/Synthesis .....	7
	2.2 Time domain Analysis/Synthesis .....	8
	2.3 Frequency Domain Analysis/Synthesis .....	9
	2.3.1 Linear Predictive Coding .....	9
	2.3.2 Formant Analysis/Syntheis .....	12
	2.4 Artificial Constructive Synthesis .....	13
	2.5 Frequency Analysis of Signals .....	13
	2.5.1 Frequency Analysis for Continuous Time Periodic Signals .....	14
	2.5.2 Frequency Analysis Continuous Time Aperiodic Signals .....	15
	2.5.3 The Fourier Series for Discrete Time Periodic Signals .....	15
	2.5.4 The Fourier Transform for Discrete Time Aperiodic Signals .....	16
	2.6 DFT-The Discrete Fourier Transform .....	16
	2.6.1 Direct Computation of the DFT .....	17

## CONTENTS (Continued.....)

CHAPTER No.	TITLE	PAGE
III	SPEECH SYNTHESIS-A CASE STUDY .....	
	3.1 SPO-256 Narrator Speech Processor Features .....	19
	3.2 Details of SPO-256 Speech Processor .....	20
	3.2.1 Pin Configuration of SPO-256 .....	20
	3.2.2 SPO-256 Block Diagram .....	21
	3.2.3 Pin Functions of SPO-256 .....	22
	3.2.4 Electrical Characteristics .....	24
	3.2.5 Timing Diagram .....	25
	3.2.6 Dictionary .....	26
	3.2.7 Consonant and Vowel Phonemes of English .....	29
	3.2.8 Guidelines for Using the Allophones .....	30
	3.2.9 Allophone Address Table .....	32
	3.3 Hardware Implementation .....	35
	3.4 System Interface .....	35
	3.5 Details of Amplifier TBA 810 .....	37
	3.6 Interface Block Diagram .....	38
	3.7 Software Implementation .....	41
	3.8 Software Program .....	42
	3.8.1 Look up Table .....	43
	3.9 Updating of Vocabulary .....	43
IV	SPEECH WAVEFORM ANALYSIS .....	
	4.1 Introduction .....	49

## CONTENTS (Continued....)

CHAPTER No.	TITLE	PAGE
	<b>4.2 Speech Waveform Analysis Method . . . . .</b>	50
	<b>4.2.1 Single Cycle Analysis Method . . . . .</b>	50
	<b>4.3 Recording Procedure of Speech Sounds with the help of DSO . . . . .</b>	51
	<b>4.4 Procedure of Analysis . . . . .</b>	52
	<b>4.4.1 Spike Calculations using Fourier Series . . .</b>	52
	<b>4.4.2 Cycle analysis for "one" and representation . . . . .</b>	54
	<b>4.4.3 Formant frequency, energy and power for "one" . . . . .</b>	61
	<b>4.4.4 Cycle analysis for "on" and representation . . . . .</b>	63
	<b>4.4.5 Formant frequency, energy and power for "on" . . . . .</b>	69
	<b>4.4.6 Cycle analysis for "u" and representation . . . . .</b>	71
	<b>4.4.7 Cycle analysis for "o" and representation . . . . .</b>	74
	<b>4.4.8 Cycle analysis for "E" and representation . . . . .</b>	77
	<b>4.5 Results and Discussion . . . . .</b>	80
	<b>4.6 Speech Synthesis-A Proposed Approach . . . . .</b>	82
V	<b>SUMMARY AND CONCLUSIONS . . . . .</b>	87