

CHAPTER 1. SYSTEMS: THE INPUT-OUTPUT DESCRIPTION	1
SYSTEMS: MODEL AND MATHEMATICAL MODEL	1
PROPERTIES OF AN INPUT-OUTPUT TRANSFORMATION	5
PROBLEMS	10
CHAPTER 2. LINEAR SYSTEMS: TIME-DOMAIN ANALYSIS	13
THE DIRAC DELTA (OR IMPULSE) FUNCTION	13
THE UNIT STEP FUNCTION	16
THE IMPULSE RESPONSE FUNCTION OF A LINEAR SYSTEM	18
INPUT-OUTPUT RELATION OF A LINEAR SYSTEM	21
IMPULSE RESPONSE FUNCTION OF A CASCADED SYSTEM	25
PROBLEMS	27

CHAPTER 3. LINEAR TIME-INVARIANT AND CAUSAL SYSTEMS:	
LAPLACE TRANSFORM ANALYSIS	34
THE LAPLACE TRANSFORM	34
SOME IMPORTANT TRANSFORMS	36
BASIC PROPERTIES	37
INVERSE TRANSFORMS	42
APPLICATION TO LINEAR CONSTANT COEFFICIENTS DIFFERENTIAL EQUATIONS	45
ANALYSIS OF LINEAR TIME-INVARIANT AND CAUSAL SYSTEMS BY THE LAPLACE TRANSFORM METHOD	46
THE LAPLACE TRANSFORM OF THE CONVOLUTION INTEGRAL AND THE SYSTEM FUNCTION OF A LINEAR TIME-INVARIANT AND CAUSAL SYSTEM	47
SYSTEM FUNCTION OF SYSTEMS DESCRIBED BY DIFFERENTIAL EQUATIONS	50
PROBLEMS	52
CHAPTER 4. SIGNALS: FOURIER SERIES ANALYSIS	61
ORTHOGONAL DECOMPOSITION OF A SIGNAL	61
PERIODIC SIGNALS AND FOURIER SERIES	64
DISCRETE SPECTRA: AMPLITUDE AND PHASE, REAL SIGNALS	67
MEAN (OR LEAST) SQUARE APPROXIMATION	70
THE MEAN SQUARE ERROR	75
PROBLEMS	78

CHAPTER 5. LINEAR TIME-INVARIANT SYSTEMS:	
FOURIER TRANSFORM ANALYSIS	86
FOURIER TRANSFORMS	86
PROPERTIES	88
ANALYSIS OF LINEAR TIME-INVARIANT SYSTEMS: THE FREQUENCY (RESPONSE) FUNCTION	91
BAND-LIMITED SIGNALS: SAMPLING THEOREM	94
PROBLEMS	98
NOTES	104
APPENDIX: REVIEW PROBLEMS	108
BIBLIOGRAPHY	170
INDEX	171