

of arcane mathematical jargon, as well as expose the merits of the assumption contemplated in the formulation. In lieu of offering a dense textbook on Laplace Transforms, I opted to stick to my personal notes that give the memorable zest of a subject that could easily remembered when not frequently used. Brief Outline of Contents: CHAPTER 1. THE LAPLACE TRANSFORMATION AND INVERSE TRANSFORMATION 1.1. Integral transforms 1.2. Some elementary Laplace transforms 1.3. The Laplace transformation of the sum of two functions 1.4. Sectionally or piecewise continuous functions 1.5. Functions of exponential order 1.7. Null functions 1.8. Inverse Laplace transforms 1.10. Laplace transforms of derivatives 1.11. Laplace transforms of integrals 1.12. The first shift theorem of multiplying the object function by eat 1.15. Determination of the inverse Laplace transforms by the aid of partial fractions 1.16. Laplace's solution of linear differential equations with constant coefficients CHAPTER 2. GENERAL THEOREMS ON THE LAPLACE TRANSFORMATION 2.1. The unit step function 2.2. The second translation or shifting property 2.4. The unit impulse function 2.5. The unit doublet 2.7. Initial value theorem 2.8. Final value theorem 2.9. Differentiation of transform 2.11. Integration of transforms 2.12. Transforms of periodic functions 2.13. The product theorem-Convolution 2.15. Power series method for the determination of transforms and inverse transforms 2.16. The error function or probability integral 2.22. The inversion integral CHAPTER 3. ELECTRICAL APPLICATIONS OF THE LAPLACE TRANSFORMATION CHAPTER 4. DYNAMICAL APPLICATIONS OF LAPLACE TRANSFORMS CHAPTER 5. STRUCTURAL APPLICATIONS 5.1. Deflection of beams CHAPTER 6. USING LAPLACE TRANSFORMATION IN SOLVING LINEAR PARTIAL DIFFERENTIAL EQUATIONS 6.1. Transverse vibrations of a stretched string under gravity 6.2. Longitudinal vibrations of bars 6.3. Partial differential equations of transmission lines 6.4. Conduction of heat 6.5. Exercise on using Laplace Transformation in solving Linear Partial Differential Equations

An Introduction to Laplace Transforms and Fourier Series

Complex Variables and the Laplace Transform for Engineers

Laplace Transforms and Their Applications to Differential Equations

Vector-valued Laplace Transforms and Cauchy Problems

Laplace Transforms and Partial Differential Equations is an undergraduate and graduate handy booklet with content which covers some given differential equations each of which is provided with clear easy- to- understand solution.

Book 6 in the Princeton Mathematical Series. Originally published in 1941. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

In this book, there is a strong emphasis on application with the necessary mathematical grounding. There are plenty of worked examples with all solutions provided. This enlarged new edition includes generalised Fourier series and a completely new chapter on wavelets. Only knowledge of elementary trigonometry and calculus are required as prerequisites. An Introduction to Laplace Transforms and Fourier Series will be useful for second and third year undergraduate students in engineering, physics or mathematics, as well as for graduates in any discipline such as financial mathematics, econometrics and biological modelling requiring techniques for solving initial value problems.

This material represents a collection of integrals of the Laplace- and inverse Laplace Transform type. The usef- ness of this kind of information as a tool in various branches of Mathematics is firmly established. Previous publications include the contributions by A. Erdelyi and Roberts and Kaufmann (see References). Special consideration is given to results involving higher functions as integrand and it is believed that a substantial amount of them is presented here for the first time. Greek letters denote complex parameters within the given range of validity. Latin letters denote (unless otherwise stated) real positive parameters and a possible extension to complex values by analytic continuation will often pose no serious problem. The authors are indebted to Mrs. Jolan Eross for her tireless effort and patience while typing this manu script. Oregon State University Corvallis, Oregon Eastern Michigan University Ypsilanti, Michigan The Authors Contents Part I. Laplace Transforms In troduction. 1 1. 1 General Formulas. 3 1. 2 Algebraic Functions. 12 1. 3 Powers of Arbitrary Order. 21 1. 4 Sectionally Rational- and Rows of Delta Functions 28 1. 5 Exponential Functions. 37 1. 6 Logarithmic Functions. 48 1. 7 Trigonometric Functions. 54 1. 8 Inverse Trigonometric Functions. 81 1. 9 Hyperbolic Functions. 84 1. 10 Inverse Hyperbolic Functions. 99 1. 11 Orthogonal Polynomials 103 1. 12 Legendre Functions 113 1. 13 Bessel Functions of Order Zero and Unity 119 1. 14 Bessel Functions. 134 1. 15 Modified Bessel Functions

Laplace Transform

A Student's Guide to Laplace Transforms

Theory and Applications

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