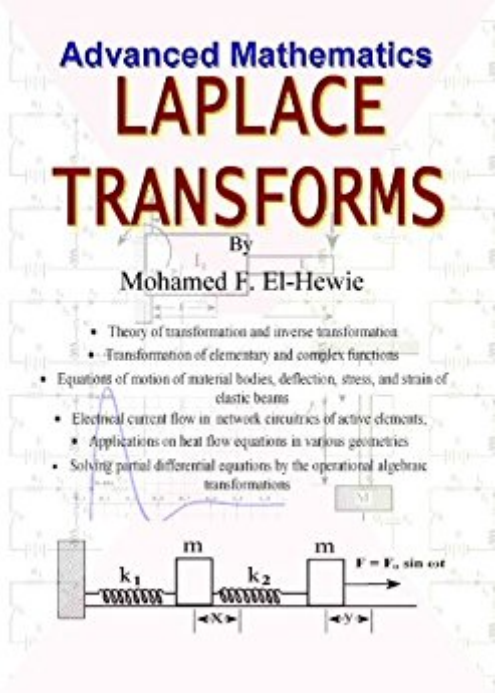
Laplace Transform



Synopsis

This is a revised edition of the chapter on Laplace Transforms, which was published few years ago in Part II of My Personal Study Notes in advanced mathematics. In this edition, I typed the cursive scripts of the personal notes, edited the typographic errors, but most of all reproduced all the calculations and graphics in a modern style of representation. The book is organized into six chapters equally distributed to address: (1) The theory of Laplace transformations and inverse transformations of elementary functions, supported by solved examples and exercises with given answers; (2) Transformation of more complex functions from elementary transformation; (3) Practical applications of Laplace transformation to equations of motion of material bodies and deflection, stress, and strain of elastic beams; (4) Solving equations of state of motion of bodies under inertial and gravitational forces.(5) Solving heat flow equations through various geometrical bodies; and (6) Solving partial differential equations by the operational algebraic properties of transforming and inverse transforming of partial differential equations. During the editing process, I added plenty of comments of the underlying meaning of the arcane equations such that the reader could discern the practical weight of each mathematical formula. In a way, I attempted to convey a personal sense and feeling on the significance and philosophy of devising a mathematical equation that transcends into real-life emulation. The reader will find this edition dense with graphic illustrations that should spare the reader the trouble of searching other references in order to infer any missing steps. In my view, detailed graphic illustrations could soothe the harshness 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 transforms1.2. 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. LaplaceÃ¢â ¬â„¢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 theoremÃ¢â ¬â •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 EquationsLaplace transform, electric current, heat flow, partial diff equation, equation of motion

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Customer Reviews

Laplace transforms are not for everyone. They transform a complex mathematical expression into a manageable alternative form that can be integrated or differentiated. You need a lot of prerequisite mathematics to understand Laplace transforms -- algebra, analytic geometry, calculus and differential equations and an understanding of what you learned means in reality. Given that, it is very concise. Laplace transforms are a powerful means to a mathematical end. The author handled the topic well.

This is one of those self published little gems, but unlike so many others, has a LOT of value if you can organize it yourself. First, there is no index, so the 150 or so worked problems flow generally from the chapters, but for specifics you'll have to create your own index if you want to use it as a reference work. Second, the Chapter titles at the beginning are very general, and don't agree with the Intro (which says, for example, that 4 is about electrical current flow (meaning "topic" 4) in circuits, whereas CHAPTER 4 is actually about strings, dynamic systems, etc.The formulas and solutions are high quality, with few errors, and have plenty of diagrams. Despite the promotional reviews there are NOT really a lot of verbal descriptions, because the book moves at a very rapid place from example to example in order to pack at least one or two examples of each type of problem in 300 pages. The author does use the solution notation convention so later problems do refer back to previous exercises.In summary, these are the class notes of a very bright mathematician, and show the sub steps for each technique quite clearly, as long as you know the symbols and understand the operations, which are not explained in detail. Not a lot of space is spent on inverses, which are really the toughest part of transform operators, but the problems selected solve quite clearly without the need for highly complex inversion manipulations. Some of the applications covered include solutions of PDE's, electrical applications, structural and dynamic applications, and of course equations of motion, waves, vibrating strings, etc.For the price, a lot of good worked examples if you can get around the lack of indexing. Although there are also problems and solutions that are somewhat didactic, the book doesn't really follow a "course" format as much as topics and examples, more for the engineer who has forgotten a technique and wants to look up an example solution. From that point of view, very well done.If there is one "best practice" in this book that I wish other, more polished texts from Wiley and Springer would follow, it is the fact that the author, while assuming you know transforms, does NOT assume you know all the intermediate steps in each problem - solution, so there are far fewer "jumps" to figure out-- the jumps are given!! For learning, maybe you need the discipline of finding intermediate steps yourself, but for real life applications and problems, you'll thank the author for including them.

It resumed a lot the process to Laplace Transformation. It is very convenient for beginners.

Laplace Transform An Introduction to Laplace Transforms and Fourier Series (Springer Undergraduate Mathematics Series) Laplace Transforms Spartan Fit!: 30 Days. Transform Your Mind. Transform Your Body. Commit to Grit. Home Rules: Transform the Place You Live into a

Place You'll Love InSideOut Coaching: How Sports Can Transform Lives Painting Beautiful Watercolor Landscapes: Transform Ordinary Places into Extraordinary Scenes Relational Judaism: Using the Power of Relationships to Transform the Jewish Community Eating in the Light of the Moon: How Women Can Transform Their Relationship with Food Through Myths, Metaphors, and Storytelling The Brain Warrior's Way Cookbook: Over 100 Recipes to Ignite Your Energy and Focus, Attack Illness and Aging, Transform Pain into Purpose The Brain Warrior's Way: Ignite Your Energy and Focus, Attack Illness and Aging, Transform Pain into Purpose Capture Your Style: Transform Your Instagram Photos, Showcase Your Life, and Build the Ultimate Platform Alchemy of Herbs: Transform Everyday Ingredients into Foods and Remedies That Heal Spiritual Disciplines Handbook: Practices That Transform Us Restoring Your Digestive Health:: How The Guts And Glory Program Can Transform Your Life Radical Beauty: How to Transform Yourself from the Inside Out The Beauty Detox Foods: Discover the Top 50 Beauty Foods That Will Transform Your Body and Reveal a More Beautiful You The Best Care Possible: A Physician's Quest to Transform Care Through the End of Life The 22-Day Revolution: The Plant-Based Program That Will Transform Your Body, Reset Your Habits, and Change Your Life The Power to Heal: Civil Rights, Medicare, and the Struggle to Transform America's Health Care System