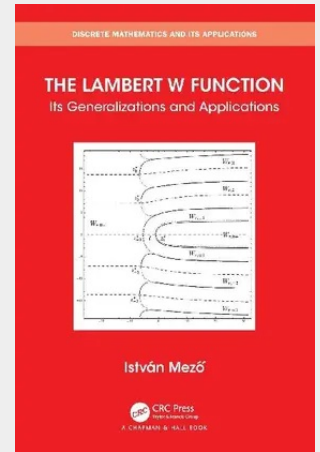


The Lambert W Function

Its Generalizations and Applications

This book is the very first one in the English language entirely dedicated to the Lambert W function, its generalizations, and its applications. One goal is to promote future research on the topic. The book contains all the information one needs when trying to find a result. The most important formulas and results are framed. The Lambert W function is a multi-valued inverse function with plenty of applications in areas like molecular physics, relativity theory, fuel consumption models, plasma physics, analysis of epidemics, bacterial growth models, delay differential equations, fluid mechanics, game theory, statistics, study of magnetic materials, and so on. The first part of the book gives a full treatise of the W function from theoretical point of view. The second part presents generalizations of this function which have been introduced by the need of applications where the classical W function is insufficient. The third part presents a large number of applications from physics, biology, game theory, bacterial cell growth models, and so on. The second part presents the generalized Lambert functions based on the tools we had developed in the first part. In the third part familiarity with Newtonian physics will be useful. The text is written to be accessible for everyone with only basic knowledge on calculus and complex numbers. Additional features include the Further Notes sections offering interesting research problems and information for further studies. Mathematica codes are included. The Lambert function is arguably the simplest non-elementary transcendental function out of the standard set of sin, cos, log, etc., therefore students who would like to deepen their understanding of real and complex analysis can see a new "almost elementary" function on which they can practice their knowledge.

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