EXTRACT FROM OP-SF NET

Topic #7----------OP-SF NET 20.2 ---------March 15, 2013

The following information about the book W. Freeden and A M. Gutting, Special
functions of mathematical (geo-)physics,Birkhäuser, 2013 Is from the web site
http://www.springer.com/birkhauser/mathematics/book/978-3-0348-0562-9

- Presents special functions as essential tools contributing to solutions for
  geoscientific problems
- Attractive textbook for the education in geomathematics
- Addresses mathematicians, physicists, geo-engineers and geoscientists

Special functions enable us to formulate a scientific problem by reduction such
that a new, more concrete problem can be attacked within a well-structured framework,
usually in the context of differential equations. A good understanding of special functions
provides the capacity to recognize the causality between the abstractness of the
mathematical concept and both the impact on and cross-sectional importance to the
scientific reality.

The special functions to be discussed in this monograph vary greatly, depending on the
measurement parameters examined (gravitation, electric and magnetic fields,
deformation, climate observables, fluid flow, etc.) and on the respective field
characteristic (potential field, diffusion field, wave field). The differential equation under
consideration determines the type of special functions that are needed in the desired
reduction process.

Each chapter closes with exercises that reflect significant topics, mostly in
computational applications. As a result, readers are not only directly confronted
with the specific contents of each chapter, but also with additional knowledge
on mathematical fields of research, where special functions are essential to
application. All in all, the book is an equally valuable resource for education in
geomathematics and the study of applied and harmonic analysis.

Students who wish to continue with further studies should consult the literature
given as supplements for each topic covered in the exercises.

Content Level » Upper undergraduate

Keywords » Cauchy–Navier and Navier-Stokes equation - Laplace and Poisson equation
- Maxwell equation - constructive approximation by function systems - spherically and
periodically oriented functions - spheroidization and periodization