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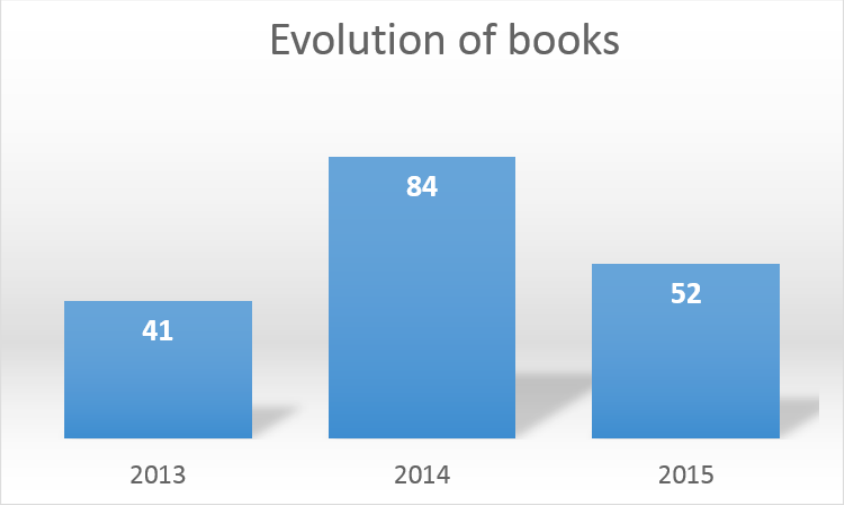
BOOKS

EVOLUTION OF BOOKS UNDER AFFILIATIONS OF UPT 2013-2015

A published book is indisputable evidence of research that has been performed, completed, and accepted by peers. Book is also an indicator of achievement of a certain academic standard. Besides communication of a finalised piece of research, the book is the basis for further opinions, views and critiques from fellow professionals and academics separated by time and distance. Most importantly, it represents the only permanent record of scientific work that has been completed.

In this chapter we present the books written by our professors and researchers, published at Romanian publishers and as well as at international prestigious publishers.



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Books in highlight

THE OPTIMAL HOMOTOPY ASYMPTOTIC METHOD. ENGINEERING APPLICATIONS

Vasile MARINCA, Nicolae HERISANU

SPRINGER International Publishing AG Switzerland, 2015, 465 p.
ISBN 978-3-319-15373-5, DOI 10.1007/978-3-319-15374-2

Short description of the context

This book published in 2015 by the famous Springer International Publishing AG Switzerland, which is part of Springer Science+Business Media (www.springer.com), is a detailed continuation of another book written by the same authors and published by Springer in 2011: "Nonlinear Dynamical Systems in Engineering: Some Approximate Approaches", ISBN 978-3-642-22735-6.

Purpose and Motivation of the book

The main goal of the book is to emphasize the applicability of the Optimal Homotopy Asymptotic Method (OHAM) to various engineering applications. It contains a great amount of models related to the fields of vibration, classical and fluid mechanics, thermodynamics, electrical machines, physics, and so on.

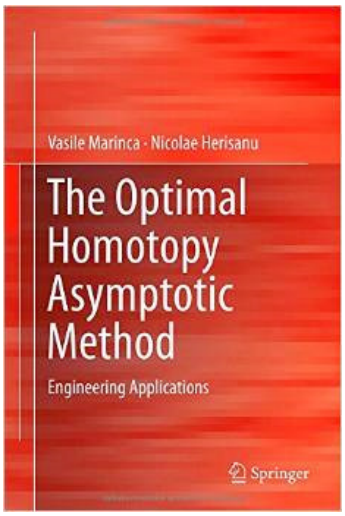
Summary

The book is organized on 5 chapters.

- Chapter 1 is an introduction and the second chapter presents a short history of the development of homotopy methods, including the basic idea of the Optimal Homotopy Asymptotic Method (OHAM) proposed for the first time in the literature by the authors of this book in 2008.

- It is to remark that many researchers adopted this method within their investigations and more PhD thesis were already defended based on application of the method proposed by the authors of this book.
- The following three chapters, from Chapter 3 to Chapter 5 introduce three distinct alternatives of the Optimal Homotopy Asymptotic Method solving illustrative applications to various nonlinear dynamical systems.

- The first alternative of OHAM involving two iterations is introduced in Chapter 3, where are detailed developed five applications from the fields of nonlinear oscillations and fluid mechanics.



- The Chapter 4 is devoted to the Optimal Homotopy Asymptotic Method with a single iteration and solving the linear equation on the first approximation. This is the most extended chapter, since here are treated 32 models from the fields of nonlinear damped and undamped oscillations, fluid mechanics, thermodynamics, electrical machines, and even from physics and biology.

- Finally, Chapter 5 deals with the Optimal Homotopy Asymptotic Method with a single iteration, but without solving the equation in the first approximation.

- The whole book contains 41 case studies from various engineering branches and is based solely on the research activity and research results of the two authors. There are included 256 figures, 177 tables and more than 350 references.

- It is to remark that the book is already present in the libraries of the most important top universities of the world and is mainly intended for researchers, university staff, PhD students and also for MSc students.

GROUND-SOURCE HEAT PUMPS: FUNDAMENTALS, EXPERIMENTS AND APPLICATIONS

Ioan SARBU, Calin SEBARCHIEVICI
ELSEVIER, 2015, 216 p.
ISBN 978-0-12-804220-5, DOI: 10.1016/B978-0-12-804220-5.00001-1

Short description of the context

This book published in 2015 by the famous Elsevier Ltd. treats a modern issue of great current interest at a high scientific and technical level, based both on original research and achievements and on the synthesis of consistent bibliographic material to meet the increasing need for modernisation and for greater energy efficiency of building services to significantly reduce CO2 emissions.

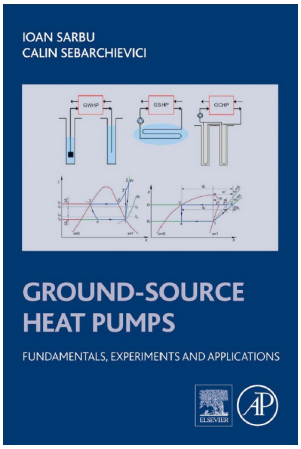
Purpose and Motivation of the book

The book mainly presents a detailed theoretical study and experimental investigations on ground source heat pump technology, concentrating on ground-coupled heat pump systems. It also offers a comprehensive and consistent overview of geothermal heat pump applications, performance and combination with heating/cooling systems and covers the technical, economic and energy savings aspects related to the design, modelling and operation of these systems. Additionally, the book presents information concerning the characteristics of working refrigerants in mechanical compression heat pumps and specific equipments.

Summary

The book is structured into seven chapters.

- Chapter 1 summarises a description of renewable energy, concentrating on geothermal energy, and presents the operation principle of a heat pump (HP) and the necessity for using HPs in the heating/cooling systems of buildings.
- Chapter 2 discusses the vapour compression-based heat pump (VCBHP) systems and describes the theoretical and real thermodynamic cycles and their calculation, as well as the operation regimes of a VCBHP with electro-compressor.
- Chapter 3 presents a study on the recent development of possible substitutes for non-ecological refrigerants for heating, ventilating, air conditioning and refrigeration equipment based on thermodynamic, physical and environmental properties and total equivalent warming impact analysis. The studies reported with new refrigerants in heat pumps, domestic and commercial refrigerators, chillers and air-conditioners are also explored.
- Chapter 4 presents a detailed description of the refrigeration compressor types (reciprocating, rotary screw, centrifugal and scroll compressors) and the HP types. Important information on the selection of the heat source and HP systems and domestic hot water (DHW) production for nearly zero-energy buildings are discussed.



- Chapter 5 presents a detailed description of ground characteristics, ground-source heat pumps (GSHPs), and GSHP development. It also discusses the most common simulation models and programs of the vertical ground heat exchangers or borehole heat exchangers currently available, and describes different applications of the models and programs.
- Chapter 6 performs an energy-economic analysis and compares different heating systems in terms of energy consumption, thermal comfort and environmental impact. The energy, economic and environmental performances of a closed-loop ground-coupled heat pump (GCHP) system is analysed and the main performance parameters (energy efficiency and CO2 emissions) of radiators and radiant floor heating systems connected to GCHPs are also compared. Additionally, two numerical simulation models of useful thermal energy and the system coefficient of performance in heating mode are developed using the Transient Systems Simulation (TRNSYS) software.
- Chapter 7 focuses on the energy and environmental analysis and modelling of a reversible GCHP. One of the main innovative contributions of this study is in the achievement and implementation of an energy-operational optimisation device for the GCHP system using quantitative adjustment with a buffer tank and a variable speed circulating pump. Experimental measurements are used to test the performance of the GCHP system at different operating modes. Finally, two simulation models of thermal energy consumption in heating/cooling and DHW operation were developed using TRNSYS software.

It is remark that the book is already present in the libraries of the most important top universities of the world and is mainly intended for researchers, academics, graduate students, MSc students and PhD students, and also for industrialists or consultants in this area.

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