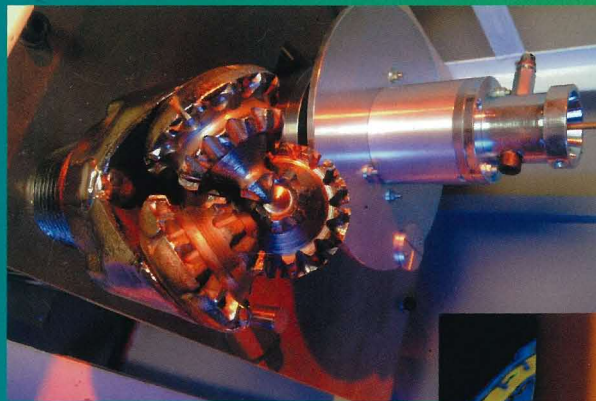


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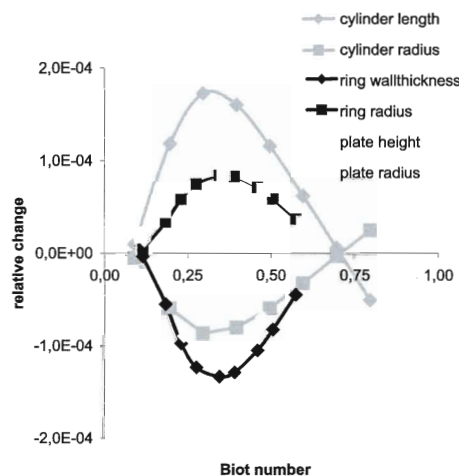
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ORIGINAL PAPERS

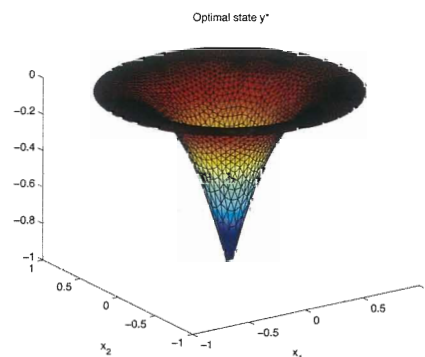
- Page **758–775** — Michael Wolff, Michael Böhm, and Friedhelm Frerichs
 Dimensional analysis of a model problem in thermoelasto-plasticity for cylindrical bodies under heating and cooling

A dimension analysis for a model problem in thermoelasto-plasticity for (hollow) cylindrical bodies is performed, focusing on heating and cooling processes and employing a weak or variational formulation of the arising mathematical model. After finding the dimensionless numbers by a standard procedure, another set of dimensionless numbers associated with the weak formulation is obtained. Besides this, a dimension analysis to investigate distortion due to quenching is applied.



- Page **776–792** — Roland Griesse, Nataliya Metla, and Arnd Rösch
 Convergence analysis of the SQP method for nonlinear mixed-constrained elliptic optimal control problems

Semilinear elliptic optimal boundary control problems with nonlinear pointwise mixed control-state constraints are considered. Necessary and sufficient optimality conditions are given. The local quadratic convergence of the SQP method is proved and confirmed by numerical results.



- Page **793–807** — D. Dupuy, G. P. Panasenko, and R. Stavre
 Asymptotic solution for a micropolar flow in a curvilinear channel

This paper is concerned with an asymptotic approach for a micropolar flow through a thin curvilinear channel. A priori estimates (which we obtain together with the existence and the uniqueness of the solution) are used to establish the error between the exact solution and the asymptotic one and to justify the asymptotic analysis. We obtain the expression of an expansion of order K and we study the general problems for the boundary layer functions. Under some additional assumptions on the data we obtain satisfactory error estimates.

Page **808–816**

J. Appell, Irina N. Pryadko, and Boris N. Sadovsky

On the stability of some relay-type regulation system

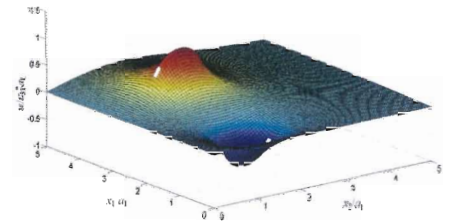
This note is concerned with the stability problem for solutions of a system which arises in the mathematical modelling of a temperature regulation device. It is well-known that, for autonomous systems, a periodic regulation process can be asymptotically stable only if it is stationary. In this paper we consider the case where the “heating” equation is time-dependent. We show that in this case, under suitable hypotheses, the solution is asymptotically stable, and we also give estimates for approximations of solutions.

Page **817–827**

X. Wang and E. Pan

Elastic fields due to a rectangular inclusion with uniform antiplane eigenstrains in a bimaterial consisting of two orthotropic quarter planes

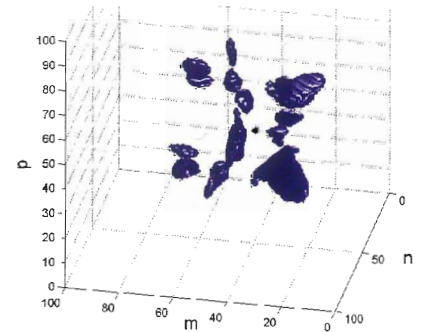
The Green’s function method is employed to derive closed-form solutions for displacement, strains and stresses due to a rectangular inclusion with uniform antiplane eigenstrains in an orthotropic quarter plane and in a bimaterial composed of two orthotropic quarter planes bonded together. It is observed that both the strains and stresses exhibit logarithmic singularity near the four vertices of the rectangular inclusion. Numerical results are also presented to show the distribution of the eigenstrain-induced displacement and stress fields in the quarter planes.

Page **828–846**

J. E. Macías-Díaz and A. Puri

A numerical method with properties of consistency in the energy domain for a class of dissipative nonlinear wave equations with applications to a Dirichlet boundary-value problem

In this work, the authors present a conditionally stable finite-difference scheme that consistently approximates the solution of a general class of (3+1)-dimensional nonlinear equations that generalizes in various ways the quantitative model governing discrete arrays consisting of coupled harmonic oscillators. Associated with this method, there exists a discrete scheme of energy that consistently approximates its continuous counterpart. The method has the properties that the associated rate of change of the discrete energy consistently approximates its continuous counterpart, and it approximates both a fully continuous medium and a spatially discretized system. Conditional stability of the numerical technique is established, and applications are provided to the existence of the process of nonlinear supratransmission in generalized Klein-Gordon systems and the propagation of binary signals in semi-unbounded, three-dimensional arrays of harmonic oscillators coupled through springs and perturbed harmonically at the boundaries, where the basic model is a modified sine-Gordon equation; our results show that a perfect transmission is achieved via the modulation of the driving amplitude at the boundary. Additionally, we present an example of a nonlinear system with a forbidden band-gap which does not present supratransmission, thus establishing that the existence of a forbidden band-gap in the linear dispersion relation of a nonlinear system is not a sufficient condition for the system to present supratransmission.



BOOK REVIEWS

- Page **792** ————— Karl-Eugen Kurrer, *The History of the Theory of Structures. From Arch Analysis to Computational Mechanics*, Verlag Ernst & Sohn Berlin 2008.
Reviewer: Norbert Gebbeken, Munich
- Page **816** ————— Manfred Nader, *Compensation of Vibrations in Smart Structures: Shape Control, Experimental Realization, and Feedback Control*, Trauner Verlag, Schriften der Universität Linz 2008.
Reviewer: T. Nestorović, Magdeburg
- Page **827** ————— J. N. Reddy, *Theory and Analysis of Elastic Plates and Shells*, 2nd Ed., CRC Press, Taylor & Francis Group Boca Raton, FL 2007.
Reviewer: Holm Altenbach, Halle (Saale)
- Page **827** ————— W. Hauger, V. Mannl, W. A. Wall und E. Werner, *Aufgaben zu Technische Mechanik 1–3. Statik, Elastostatik, Kinetik*, 6., korr. Auflage, Springer-Verlag Berlin 2008.
Rezensent: Holm Altenbach, Halle (Saale)

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Book Review

Karl-Eugen Kurrer, The History of the Theory of Structures. From Arch Analysis to Computational Mechanics, Verlag Ernst & Sohn Berlin, 2008. 848 pages, Hardcover, € 119.00, sFr 188.00, ISBN: 978-3-433-01838-5

When the reviewer studied civil engineering in the seventies, he concentrated on the numerical formulation of ultimate limit state calculations, a new discipline at that time. During discussions he was confronted with arguments, such a kind, that it should not be allowed to assure against plastic limit states. It was referred to disputations of Stüssi, Kollbrunner, and Kazinczy in the thirties. This was the beginning of the activities of the reviewer in the field of the history of the nonlinear behaviour of structures. While doing literature research he realised that there was really no literature available on the history of the theory of structures.

Nevertheless, he learned that it is very effective to study a topic, starting from the very beginning in history. How observed researchers, universal genius like Leonardo da Vinci, nature and how did they describe the observations? What was their way of thinking? How did they develop models? Why it took almost hundred years to achieve what is today called Bernoulli's hypothesis? To find answers to such

questions makes it much easier to understand better development processes and to teach students. It takes time to understand.

To the knowledge of the reviewer, Eugen Kurrer is the first and only world wide, who studied the history of the theory of structures. In his book, he described that there are seven gates to the knowledge of the history of the theory of structures, as they are: History of science, Construction history, Didactics, Biographic studies, Bibliographic studies, Aesthetics, and Theory of science. One could add Civil engineering structures embedded in culture and time.

In times where students are convinced that the world behaves in accordance with available numerical tools, and they do not realize that they turn physics upside down, it becomes more and more important to refer back to the origins of our profession.

Eugen Kurrers book is fascinating and it has already become part of my teaching. I would like to recommend it not only to students and civil engineers, it is of great interest to all interested in load-bearing structures, wherever in aerospace engineering, mechanical engineering, sport-equipment industry, etc.

It is an opus of uniqueness.

Munich

Norbert Gebbeken