ity, we provide another method by utilizing the high-order Gauss-Kronrod quadrature rule. Numerical experiments are performed to illustrate the proposed approaches.

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CP15

Solving the P-Laplacian Equation by Using Finite Elements Methods Leading to a Optimization Problem

A solution for the p-Laplacian equation using finite elements methods was introduced. It leads to an optimization problem that can be solved by simplex method. Besides, it was briefly discussed the solution of the non-Newtonian filtration equation.

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CP16

Functional Observers for Nonlinear Systems

The construction of a functional observer is well-motivated in many monitoring and control applications where full state information is not needed, but instead it is a given fuction of the states that needs to be estimated. The present paper will develop a theoretical formulation of the problem of designing functional observers for general nonlinear systems, in a way that directly extends linear Luenberger theory of functional observers. Notions of functional observer linearization will also be formulated, the objective being to achieve exactly linear error dynamics in transformed coordinates, and with prescribed rate of decay of the error. Necessary and sufficient conditions for the existence of a lower-order functional observer with linear dynamics and linear output map will be derived.

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CP16

Observer Based Fault Detection in Differential Algebraic Equations

Fault detection is an important part of most modern industrial systems and processes. One approach to fault detection is based on the use of observers. Many physical processes are most naturally modeled by differential algebraic equations. Recently there has been significant progress in the design of observers for complex differential algebraic equations. This paper examines the use of observers for fault detection in systems modeled by differential algebraic equations.

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CP16

Observer-Based Feedback Control of a Mathematical Model of Intimal Hyperplasia

A theoretical model of a potential treatment for intimal hyperplasia due to hemodialysis is proposed. This model consists of two parts. The first part is modeling the development of intimal hyperplasia as a diffusion process of muscle cells from the media to the lumen, for which the governing equation is a partial differential equation. The second part is designing an observer-based feedback controller to stabilize the equilibrium point of the system, corresponding to no intimal hyperplasia. Simulation results show that the intimal hyperplasia can be reduced to near zero in approximately 57 days of treatment.

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CP17

Tropical Optimization Problems: Solution Methods and Application Examples

Multidimensional optimization problems in the tropical mathematics setting are considered. The problems are to minimize (maximize) linear and nonlinear functionals defined on finite-dimensional semimodules over idempotent semifields, subject to constraints in the form of linear equations and inequalities. We outline known problems and discuss their solution methods. New unconstrained and constrained optimization problems are then examined and related exact solutions are given in a compact vector form. As an application, we present solutions of real-world problems in project scheduling and location analysis.

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CP17

On the Integer Max-Linear Programming Problem

Let $a \oplus b = \max(a, b)$ and $a \otimes b = a + b$ for $a, b \in \overline{R} = R \cup \{-\infty\}$ and extend these operations to matrices and vectors as in conventional algebra. The integer max-linear programming problem seeks to minimise or maximise $f^T \otimes x$ subject to the two sided system $A \otimes x \oplus c = B \otimes x \oplus d$ for integer x. Pseudopolynomial methods for solving this problem are known. We give a generic case where we can describe all feasible integer solutions, the optimal objective value and an optimal solution in strongly polynomial time.