S. Paszkowski: "Generalized Padé approximation and hypergeometric series". Study of generalizations of Padé approximants which can be written as combinations of the values of an arbitrary function. Such generalizations are related to the hypergeometric series.

M. Pindor: "Variational calculation of matrix elements of operator Padé approximants" (abstract). It is shown that a variational technique based on the Schwinger principle can be used for calculating matrix elements of operator Padé approximants.

G. Servizi, G. Turchetti: "On the perturbation expansion for classical Anharmonic oscillators". Determination of the stochastic transition by methods based on Padé approximation to locate the singularities of the perturbation series.

J. M. Trojan: "An upper bound on the acceleration of convergence". The problem of the global estimation of the quality of the acceleration obtained with a given algorithm for a given class of sequences is studied. It is shown how much one can accelerate sequences obtained by iterative processes.

C. Brezinski

Université des Sciences et Techniques de Lille
Villeneuve D'Ascq, France

3[65G10, 65L05].—P. Eijgenraam, *The Solution of Initial Value Problems Using Interval Arithmetic Formulation and Analysis of an Algorithm*, MC Tract 144, Mathematisch Centrum, Amsterdam, 1981, iii + 185 pp., 24 cm. Price Dfl. 24,15.

It has been well known that one should not use straightforward vectors of intervals in the stepwise attempt to bound the solution of an initial value problem for a system of first-order ordinary differential equations as their span may grow considerably faster than is appropriate for the analytic problem. Instead, as has been suggested by R. E. Moore, one should rather employ linear transforms of such interval vectors.

This idea has been elaborated in the tract under review. Eijgenraam constructs an algorithm which proceeds as follows:

Given an interval vector $\bar{y}_{n-1} = A_{n-1}\bar{x}_{n-1} \in \mathbf{IR}^M$, where A_{n-1} is an $M \times M$-matrix, the algorithm finds a step h_n, a matrix A_n and an interval vector $\bar{x}_n$ such that the interval $\bar{y}_n = A_n\bar{x}_n$ contains the values at $t_n = t_{n-1} + h_n$ of all solutions of $y'(t) = f(y(t))$ which have taken a value in $\bar{y}_{n-1}$ at t_{n-1}. For this purpose, it is necessary that the following functions may be formed for $0 \leqslant i \leqslant k-2$ ($k \geqslant 2$) to be evaluated for $x \in \mathbf{R}^M$:

$$f_0(x) := f(x), \qquad f_i(x) = f'_{i-1}(x)f(x).$$

Furthermore, interval inclusions of f_{k-1} and of f'_i, $0 \leqslant i \leqslant k-2$, are needed, for interval arguments from $\mathbf{IR}^M$.

The algorithm has been carefully motivated, introduced, analyzed, and discussed, with a great number of proven results and valuable observations about its performance. Thus the volume is a valuable contribution towards the goal of designing efficient software which generates realistic strict error bounds in conjunction with a stepwise approximate solution of a first-order system of ordinary differential equations.

H. J. S.

4[10A40, 10A25, 10–04].—H. J. J. TE RIELE, *Table of* 1870 *New Amicable Pairs Generated from* 1575 *Mother Pairs*, Report NN 27/82, Mathematical Centre, Amsterdam, Oct. 1982, 43 pages.

This is ref. [8] of te Riele's paper [1]. There he gives methods of deriving new amicable pairs ("daughters") from known pairs ("mothers"). Table 1 lists the "1575 mother amicable pairs" taken mostly from Lee and Madachy and from Woods (see the paper). L & M included *every* amicable whose smaller member is less than 10^8. The first mother listed here, not in L & M, is mother #266 with smaller member 176632390. Some of the daughters are known pairs but most of them, namely 1782, are new. And 88 more "granddaughters" are also listed. Since there are more daughters than mothers, this gives a heuristic argument for the existence of infinitely many amicable pairs.

Table 2a lists the number of new daughters for each of the corresponding mothers. Mother #1398 has 85 daughters! Table 2b lists the 1782 new daughters and Table 3b lists the 88 new granddaughters (that he computed).

The smallest new daughter is the pair 114944072, 125269528 arising from the proud mother #37. This daughter would come between pairs 243 and 244 in L & M.

D. S.

1. HERMAN J. J. TE RIELE, "On generating new amicable pairs from given amicable pairs," *Math. Comp.*, v. 42, 1984, pp. 219–223.