Prijsvraag

Computer Algebra Nederland
Prize Problem

Computer Algebra Nederland Foundation (CAN) was founded in 1988. It aims to stimulate the use of computer algebra in research, education, and development. The present prize problem represents a new activity. The problem intends to draw the attention of nonspecialists to computer algebra.

The problem
Let A be an $m \times n$ matrix with coefficients in $\mathbf{Q}(x)$, the field of rational functions in the variables $x = x_1, \ldots, x_\ell$.
The question is how to determine efficiently the rank of the matrix A.

Solutions should be submitted in terms of descriptions of algorithms, comprising:

- an analysis (discussion of termination, complexity, correctness, extensibility, et cetera) and
- an implementation in a standard language or computer algebra package.

Practical 'approximate' solutions are also welcome. Here 'approximate' might refer to:

- a high probability of the rank being the correct one, or
- a small probability that the algorithm does not finish in a specified time,

or similar such loosenings of the original version.

The solution should improve on existing standard algorithms in some way. It should reach CAN before the end of 2001. Solutions will be judged by the board of CAN. If there is at least one satisfactory solution, the contributor of the best solution will receive a prize of one thousand Euro.

Employees of CAN are excluded from participation.

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