A new algorithm for unbounded knapsack problem

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Abstract

Given a knapsack of weight-carrying capacity $b$, and $n$ kinds of items of values $v_1, v_2, \ldots, v_n$, with weights $w_1, w_2, \ldots, w_n$. It is well known that the optimal solution has a periodic structure if the $b$ is sufficiently large. The classical algorithm to find the critical $b$, has time complexity $O(nb)$. Our new algorithm is of time complexity $O(nw_1)$, where $w_1$ is the weight of the best item.

The work is joint work with L.B. Landa and M.T. Shing.

Biography

T. C. Hu received his B.S. in Engineering from the National Taiwan University, M.S. in Engineering from the University of Illinois, and Ph.D. in Applied Mathematics from Brown University. He is a UCSD Professor Emeritus, and has as worked at the I.B.M. Research Center and the University of Wisconsin before joining the faulty at UCSD.

Dr. Hu’s research interests are combinatorial algorithms, mathematical programming and operations research, and computer aided designs. He has written two books, “Integer programming and Network flows” and “Combinatorial Algorithms (with M. Shing)”. Some of his research papers are: Multi-terminal network flows (with R. Gomory), Multi-commodity flows, Optimal alphabetical binary tree (with A. Tucker), Optimum algorithm for matrix chain product (with M. Shing), and Dynamic programming and graph optimization problems (with J. Morgenthaler).

Dr. Hu’s hobby is table tennis.