Packing with biased random-key genetic algorithms

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Abstract: We describe biased random-key genetic algorithms for 2D and 3D packing, where we are given rectangles (rectangular parallelepipeds) each having a associated cost and want to pack them in a large rectangle (rectangular parallelepiped) such that the total cost of the packed objects is maximized, and for 2D and 3D bin packing, where we are given rectangles (rectangular parallelepipeds) and want to pack all of them in as few large rectangles (rectangular parallelepipeds) as possible. Computational experiments on a large set of benchmark instances from the literature show the effectiveness of the algorithms. Several new best known solutions are produced for the set of benchmark instances.

This is joint work with J.F. Gonçalves of U. do Porto (Portugal) and was done while the speaker was a scientist at AT&T Labs Research in New Jersey.

Bio: *Mauricio G. C. Resende* is Principal Research Scientist at Amazon.com in Seattle WA since December 2014. Previously he was Inventive Scientist at AT&T Labs Research in New Jersey for 26 years. Dr. Resende did his undergraduate work in Electrical Engineering at the Pontifical Catholic U. of Rio de Janeiro. He obtained an MS in operations research from Georgia Tech and a PhD in operations research from the U. of California, Berkeley. He is most known for his work with metaheuristics, in particular GRASP and biased random-key genetic algorithms. Dr. Resende has published over 150 papers on combinatorial optimization and holds 15 patents. He is on the editorial board of several optimization journals, including Networks, J. of Global Optimization, J. of Heuristics, Computational Optimization and Applications, and International Transactions in Operational Research.