Polynomial unconstrained binary optimisation – Part 2

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Résumé en anglais	The class of problems known as quadratic zeroone (binary) unconstrained optimisation has provided access to a vast array of combinatorial optimisation problems, allowing them to be expressed within the setting of a single unifying model. A gap exists, however, in addressing polynomial problems of degree greater than 2. To bridge this gap, we provide methods for efficiently executing core search processes for the general polynomial unconstrained binary (PUB) optimisation problem. A variety of search algorithms for quadratic optimisation can take advantage of our methods to be transformed directly into algorithms for problems where the objective functions involve arbitrary polynomials. Part 1 of this paper (Glover et al., 2011) provided fundamental results for carrying out the transformations and described coding and decoding procedures relevant for efficiently handling sparse problems, where many coefficients are 0, as typically arise in practical applications. In the present part 2 paper, we provide special algorithms and data structures for taking advantage of the basic results of part 1. We also disclose how our designs can be used to enhance existing quadratic optimisation algorithms.
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