

Contents

1	Introduction	1
1.1	Data Correcting Approach for Real-Valued Functions	3
1.2	DC for NP-Hard Combinatorial Optimization Problems	6
1.3	The DC Approach in Action	10
1.4	Preliminary Computational Experience with ATSP Instances	15
1.5	Concluding Remarks	18
2	Maximization of Submodular Functions: Theory and Algorithms	19
2.1	Introduction	19
2.2	The Structure of Local and Global Maxima of Submodular Set Functions	21
2.3	Excluding Rules: An Old Proof	29
2.4	Preservation Rules: Generalization and a Simple Justification	31
2.5	The PPA	37
2.6	Nonbinary Branching Rules	40
2.7	Concluding Remarks	43
3	Data Correcting Approach for the Maximization of Submodular Functions	45
3.1	The Main Idea of the Data Correcting Algorithm: An Extension of the PPA	46
3.2	The DC Algorithm (See [66])	49
3.2.1	The Data Correcting Algorithm	49
3.3	The SPLP: An Illustration of the DC Algorithm	51
3.4	Computational Experiments with the QCP Problem and Quadratic Zero-One Optimization Problem: A Brief Review	53
3.5	The QCP: Computational Experiments	55
3.6	Remarks for the DC Algorithm	59
3.7	A Generalization of the DC Algorithm: A Multilevel Search in the Hasse Diagram	61
3.7.1	PPA of Order r	62
3.7.2	The Data Correcting Algorithm Based on the PPA r	67

3.7.3	Branching Rule	68
3.7.4	Computational Experiments for the QCP with the DCA(PPAr).....	70
3.8	Concluding Remarks	76
4	Data Correcting Approach for the Simple Plant Location Problem ...	79
4.1	Introduction	80
4.2	A Pseudo-Boolean Approach to SPLP	81
4.3	Cherenin's Preprocessing Rules	84
4.4	Ingredients of Data Correcting for the SPLP	89
4.4.1	The Reduction Procedure.....	92
4.4.2	The Data Correcting Procedure	94
4.5	Computational Experiments	95
4.5.1	Bilde and Krarup-Type Instances	97
4.5.2	Galvão and Raggi-Type Instances	99
4.5.3	Instances from the OR-Library.....	100
4.5.4	Körkel-Type Instances with 65 Sites.....	100
4.5.5	Körkel-Type Instances with 100 Sites	103
4.6	Concluding Remarks	104
5	Summary	107
	References.....	109

Data Correcting Approaches in Combinatorial
Optimization

Goldengorin, B.; Pardalos, P.

2012, X, 114 p. 41 illus., Softcover

ISBN: 978-1-4614-5285-0