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Solving Bilevel Programming Problems Using a Neural Network Approach and Its Application to Power System Environment

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抄録

In this paper, a hybrid neural network approach to solve mixed integer quadratic bilevel programming problems is proposed. Bilevel programming problems arise when one optimization problem, the upper problem, is constrained by another optimization, the lower problem. The mixed integer quadratic bilevel programming problem is transformed into a double-layered neural network. The combination of a genetic algorithm (GA) and a meta-controlled Boltzmann machine (BM) enables us to formulate a hybrid neural network approach to solving bilevel programming problems. The GA is used to generate the feasible partial solutions of the upper level and to provide the parameters for the lower level. The meta-controlled BM is employed to cope with the lower level problem. The lower level solution is transmitted to the upper level. This procedure enables us to obtain the whole upper level solution. The iterative processes can converge on the complete solution of this problem to generate an optimal one. The proposed method leads the mixed integer quadratic bilevel programming problem to a global optimal solution. Finally, a numerical example is used to illustrate the application of the method in a power system environment, which shows that the algorithm is feasible and advantageous.

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[1] V.V. Kalashnikov, G.A. Perez-Valdes, A. Tomasgard, and N.I. Kalashnykova: Natural gas cash-out problem: Bilevel stochastic optimization approach, *European Journal of Operational Research*, Vol. 206, No. 1, pp. 18-33, 2010.
(https://jlc.jst.go.jp/DN/JALC/00350002631?type=list&lang=ja&from=J-STAGE&dispptn=1)

[2] S. Dempe, V. Kalashnikov, and R.Z. Rios-mercado: Discrete bilevel programming: Application to a natural gas cash-out problem, *European Journal of Operational Research*, Vol. 166, No. 2, pp. 469-488, 2005.
(https://jlc.jst.go.jp/DN/JALC/00254915532?type=list&lang=ja&from=J-STAGE&dispptn=1)

[3] W. Candler and R. Norton: *Multilevel Programming and Developing Policy*, Technical Report 258, World Bank Development Research Center, 1977.

[4] J. Bard and J. Moore: A branch and bound algorithm for the bilevel programming problem, *SIAM Journal on Scientific and Statistical Computing*, Vol. 11, No. 2, pp. 281-292, 1990.

[5] E. Aiyoshi and K. Shimizu: A solution method for the static constrained stackelberg problem via penalty method, *IEEE Transactions on Automatic Control*, Vol. 29, No. 12, pp. 1111-1114, 1984.

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被引用文献(1)

Hecheng Li, Lei Fang. Co-evolutionary algorithm: An efficient approach for bilevel programming problems. Engineering Optimization, 2014, Vol.46, No.3, p.361.
(https://jlc.jst.go.jp/DN/JALC/50041339984?type=list&lang=ja&from=J-STAGE&dispptn=1)

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