SYSTEM ENGINEERING

基于非负频谱分解的厂级多重振荡源的分离研究

夏春明[a], 郑建荣[a], J.Howell[b]

[a] Centre for Mechatronics Engineering, East China University of Science & Technology, Shanghai 200237, China
[b] Department of Mechanical Engineering, University of Glasgow, Glasgow G12 8QQ, UK

摘要　Constrained spectral non-negative matrix factorization (NMF) analysis of perturbed oscillatory process control loop variable data is performed for the isolation of multiple plant-wide oscillatory sources. The technique is described and demonstrated by analyzing data from both simulated and real plant data of a chemical process plant. Results show that the proposed approach can map multiple oscillatory sources onto the most appropriate control loops, and has superior performance in terms of reconstruction accuracy and intuitive understanding compared with spectral independent component analysis (ICA).

关键词　process monitoring　multiple oscillations　non-negative matrix factorization　sparse spectral analysis　fault isolation

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Isolation of whole-plant multiple oscillations via non-negative spectral decomposition

XIA Chunming[a], ZHENG Jianrong[a], J.Howell[b]

[a] Centre for Mechatronics Engineering, East China University of Science & Technology, Shanghai 200237, China
[b] Department of Mechanical Engineering, University of Glasgow, Glasgow G12 8QQ, UK
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Abstract Constrained spectral non-negative matrix factorization (NMF) analysis of perturbed oscillatory process control loop variable data is performed for the isolation of multiple plant-wide oscillatory sources. The technique is described and demonstrated by analyzing data from both simulated and real plant data of a chemical process plant. Results show that the proposed approach can map multiple oscillatory sources onto the most appropriate control loops, and has superior performance in terms of reconstruction accuracy and intuitive understanding compared with spectral independent component analysis (ICA).

Key words process monitoring; multiple oscillations; non-negative matrix factorization; sparse; spectral analysis; fault isolation

通讯作者:
夏春明 cmxia@ecust.edu.cn
作者个人主页: 夏春明[a]; 郑建荣[a]; J.Howell[b]

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