

Accepted Manuscript

Synthesis of multiperiod heat exchanger networks with timesharing mechanisms using meta-heuristics

Leandro V. Pavão, Camila B. Miranda, Caliane B.B. Costa, Mauro A.S.S. Ravagnani

PII: S1359-4311(17)33998-4
DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.09.002>
Reference: ATE 11059

To appear in: *Applied Thermal Engineering*

Received Date: 13 June 2017
Revised Date: 17 August 2017
Accepted Date: 1 September 2017

Please cite this article as: L.V. Pavão, C.B. Miranda, C.B.B. Costa, M. A.S.S. Ravagnani, Synthesis of multiperiod heat exchanger networks with timesharing mechanisms using meta-heuristics, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.09.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Synthesis of multiperiod heat exchanger networks with timesharing mechanisms using meta-heuristics

Leandro V. Pavão, Camila B. Miranda, Caliane B. B. Costa, Mauro A. S. S. Ravagnani¹

Department of Chemical Engineering, State University of Maringá

Av. Colombo, 5790, Bloco D90, CEP 87020900, Maringá, PR, Brazil

Abstract Plants with cyclical variations in operating conditions require multiperiod heat exchanger networks (HEN) able to perform heat integration efficiently in all those periods. In such cases, however, overdesign issues arise, *i.e.*, a heat exchanger might be too large for the service it must perform in a given period, requiring fractions of the process streams to by-pass such units. In this work, timesharing mechanisms (TSM) are considered for circumventing such issues, which means heat exchanger services are not fixed throughout the different periods of operation and a single piece of equipment can perform heat integration between different pairs of streams in each cycle. Two schemes are considered with the present meta-heuristic approach to obtain a preliminary solution before applying the service switching concepts. Then, systematic service rearrangement and equipment re-sizing in a new optimization stage are performed in order to find areas more suitable for the different timesharing arrangements. The latter is a new proposed model, not present in previous works that consider timesharing schemes. Four cases from the literature were investigated and results with lower total annual costs (TAC) than those reported previously by other works were achieved.

Keywords: optimization; multiperiod heat exchanger networks; meta-heuristics

1 Introduction

The study and design of heat exchanger networks (HEN) capable of operating not only under fixed nominal process conditions, but also under seasonal variations or critical scenarios, have been an important branch of HEN synthesis research. The multiperiod HEN synthesis problem considers finite

¹ Corresponding author. Tel: +55 (44) 3011-4774, Fax: +55 (44) 3011-4793

Download English Version:

<https://daneshyari.com/en/article/4990838>

Download Persian Version:

<https://daneshyari.com/article/4990838>

[Daneshyari.com](https://daneshyari.com)