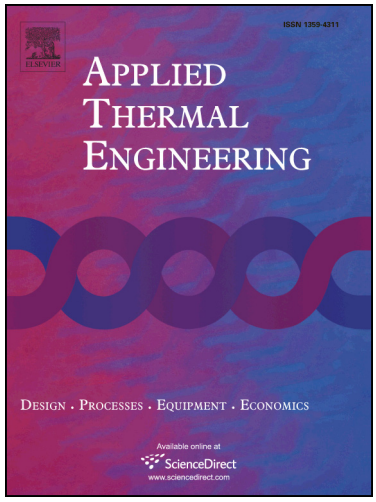
Accepted Manuscript



Analytical and numerical results for the dynamics of capillary pumped loops and loop heat pipes subjected to high amplitude heat load steps

Dutour Sébastien, Kaled Ahmed

PII: S1359-4311(17)31039-6
DOI: http://dx.doi.org/10.1016/j.applthermaleng.2017.02.065
Reference: ATE 9946

To appear in: *Applied Thermal Engineering*

Received Date: 1 October 2016
Revised Date: 6 February 2017
Accepted Date: 15 February 2017

Please cite this article as: D. Sébastien, K. Ahmed, Analytical and numerical results for the dynamics of capillary pumped loops and loop heat pipes subjected to high amplitude heat load steps, *Applied Thermal Engineering* (2017), doi: http://dx.doi.org/10.1016/j.applthermaleng.2017.02.065

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.

ACCEPTED MANUSCRIPT

Analytical and numerical results for the dynamics of capillary pumped loops and loop heat pipes subjected to high amplitude heat load steps

Dutour Sébastien[a,*], Kaled Ahmed[a]

[a] *University of Toulouse, UPS, INPT, LAPLACE, 118 route de Narbonne, F-31062 Toulouse cedex 9, France.*

Abstract

Some analytical and numerical results were presented in order to clarify which are the main parameters leading the time response of CPL and LHP subjected to high amplitude heat load steps. This study actually focused on the estimation of the liquid flow rate overshoot as this peak value can be so large that it may lead to loop failures. The analytical developments assumed that the evaporator-condenser coupling which founds the CPL/LHP transient at the earliest times is based on a second-order linear system. Satisfactory agreement was observed with some data and with some simulations investigating different loop configurations even though the reliability of the analytical results depends on the reynolds number and the friction factor in the liquid line. As they provided essential information on the loop transient, these theoretical results are precious for transient numerical developments and also for the design of loops that are suitable for demanding power cycles.

*corresponding author

Email address: sebastien.dutour@laplace.univ-tlse.fr (Dutour Sébastien)

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/4990395

Download Persian Version:

https://daneshyari.com/article/4990395

Daneshyari.com