

# Accepted Manuscript

Dimensional Scaling and Numerical Similarity in Hyperbolic Method for Diffusion

Hiroaki Nishikawa, Yoshitaka Nakashima

PII: S0021-9991(17)30836-7  
DOI: <https://doi.org/10.1016/j.jcp.2017.11.008>  
Reference: YJCPH 7707

To appear in: *Journal of Computational Physics*

Received date: 8 August 2017  
Revised date: 2 November 2017  
Accepted date: 6 November 2017

Please cite this article in press as: H. Nishikawa, Y. Nakashima, Dimensional Scaling and Numerical Similarity in Hyperbolic Method for Diffusion, *J. Comput. Phys.* (2017), <https://doi.org/10.1016/j.jcp.2017.11.008>

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.



## Highlights

- Hyperbolic diffusion models strongly depends on the grid unit unless scaled properly.
- Relaxation length must be scaled by a reference length for dimensional consistency.
- Non-dimensionalized relaxation length must be given an optimal value for superior convergence.
- A practical formula is derived for a reference length that makes  $(2\pi)^{-1}$  an optimal value.
- Scale-invariant computations are demonstrated for steady/unsteady heat conduction problems.

Download English Version:

<https://daneshyari.com/en/article/6929192>

Download Persian Version:

<https://daneshyari.com/article/6929192>

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