

Accepted Manuscript

Brauer-type eigenvalue inclusion sets of stochastic/irreducible tensors and positive definiteness of tensors

Chunli Deng, Haifeng Li, Changjiang Bu

PII: S0024-3795(18)30316-1
DOI: <https://doi.org/10.1016/j.laa.2018.06.032>
Reference: LAA 14640

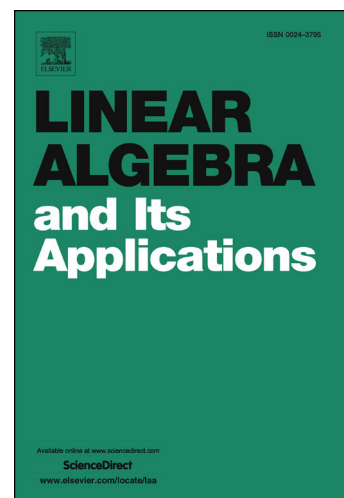
To appear in: *Linear Algebra and its Applications*

Received date: 24 March 2018

Accepted date: 29 June 2018

Please cite this article in press as: C. Deng et al., Brauer-type eigenvalue inclusion sets of stochastic/irreducible tensors and positive definiteness of tensors, *Linear Algebra Appl.* (2018), <https://doi.org/10.1016/j.laa.2018.06.032>

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.



Brauer-type eigenvalue inclusion sets of stochastic/irreducible tensors and positive definiteness of tensors

Chunli Deng^a, Haifeng Li^a, Changjiang Bu^{a,b,*}

^aCollege of Automation, Harbin Engineering University, Harbin 150001, PR China

^bCollege of Science, Harbin Engineering University, Harbin 150001, PR China

Abstract

In this paper, Brauer-type eigenvalue inclusion sets of stochastic tensors and irreducible tensors are given, respectively. Some sufficient conditions of positive (semi-)definiteness of stochastic tensors are obtained. Furthermore, the stability of a high-order nonlinear system is analysed by positive definiteness of tensors.

Keywords: Tensor, Stochastic tensor, Eigenvalue of tensor, Inclusion set, Positive definiteness, Stability of nonlinear system

AMS classification: 15A69, 15A18, 93D20

1. Introduction

Let $[n] = \{1, 2, \dots, n\}$ and $\mathbb{C}^{[m,n]}$ (resp. $\mathbb{R}^{[m,n]}$) denote the set of order m dimension n tensors over complex field \mathbb{C} (resp. real field \mathbb{R}). A tensor \mathcal{A} is called *symmetric* if all the entries of \mathcal{A} are invariant under any permutation of their indices.

In 2005, Qi [27] and Lim [24] proposed the concept of eigenvalue of tensors, respectively. Let $\mathcal{A} = (a_{i_1 i_2 \dots i_m}) \in \mathbb{C}^{[m,n]}$, if there exist $\lambda \in \mathbb{C}$ and a nonzero vector $x = (x_1, \dots, x_n)^T \in \mathbb{C}^n$ such that

$$\mathcal{A}x^{m-1} = \lambda x^{[m-1]}, \quad (1.1)$$

then λ is called an *eigenvalue* of \mathcal{A} and x is called an *eigenvector* of \mathcal{A} corresponding

*Corresponding author: Changjiang Bu

Email address: buchangjiang@hrbeu.edu.cn (Changjiang Bu)

Download English Version:

<https://daneshyari.com/en/article/8897683>

Download Persian Version:

<https://daneshyari.com/article/8897683>

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