

# Accepted Manuscript

Some norm inequalities for commutators of contracted tensor products

Ze-Jia Xie, Che-Man Cheng, Xiao-Qing Jin

PII: S0024-3795(17)30661-4  
DOI: <https://doi.org/10.1016/j.laa.2017.11.033>  
Reference: LAA 14400

To appear in: *Linear Algebra and its Applications*

Received date: 1 August 2017  
Accepted date: 29 November 2017

Please cite this article in press as: Z.-J. Xie et al., Some norm inequalities for commutators of contracted tensor products, *Linear Algebra Appl.* (2018), <https://doi.org/10.1016/j.laa.2017.11.033>

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.



# Some norm inequalities for commutators of contracted tensor products <sup>☆</sup>

Ze-Jia Xie<sup>a,\*</sup>, Che-Man Cheng<sup>b</sup>, Xiao-Qing Jin<sup>b</sup>

<sup>a</sup>*Department of Mathematics and Data Science, Dongguan University of Technology, Dongguan, 523808, China.*

<sup>b</sup>*Department of Mathematics, University of Macau, Macau, China.*

---

## Abstract

The paper concerns generalizations of the Böttcher-Wenzel inequality to contracted products of tensors. We show that the best constant in the inequality is as expected in some cases and present an example where the best constant is larger than expected.

*Keywords:* Contracted product, matricization, tensor, norm inequality, commutator

*2000 MSC:* 15A52, 15A45, 60H25, 65F35

---

## 1. Introduction

In general, the matrix multiplication is not commutative, i.e., there are matrices  $A, B \in \mathbb{R}^{n \times n}$  such that

$$AB \neq BA.$$

The difference  $AB - BA$  is called the commutator of  $A$  and  $B$ . How big is the difference between  $AB$  and  $BA$ ? For the Frobenius norm  $\|AB - BA\|_F$  one easily obtains

$$\|AB - BA\|_F \leq \|AB\|_F + \|BA\|_F \leq \|A\|_F \|B\|_F + \|B\|_F \|A\|_F = 2\|A\|_F \|B\|_F.$$

---

<sup>☆</sup>The work is supported by the research grants MYRG2016-00077-FST and MYRG2016-00121-FST from University of Macau.

\*Corresponding author

*Email addresses:* xiezejia2012@gmail.com (Ze-Jia Xie), fstcmc@umac.mo (Che-Man Cheng), xqjin@umac.mo (Xiao-Qing Jin)

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات