

# 2025 泛函分析及空间理论 天元暑期研讨班

## On entangled and multi-parameter commutators

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### Abstract

We complement the recent theory of general singular integrals  $T$  invariant under the Zygmund dilations  $(x_1, x_2, x_3) \mapsto (sx_1, tx_2, stx_3)$  by proving necessary and sufficient conditions for the boundedness and compactness of commutators  $[b, T]$  from  $L^p \rightarrow L^q$ . Previously, only the  $p = q$  upper bound in terms of a Zygmund type little BMO space was known for general operators, and there has been some confusion about the corresponding lower bound in recent literature. We give complete characterizations whenever  $p \leq q$  for a general class of non-degenerate Zygmund type singular integrals. Some of the results are surprising in view of existing papers – for instance, compactness always forces  $b$  to be constant. Even in the simpler situation of bi-parameter singular integrals this has not been observed previously.

**Time:** Wednesday, August 13, 2025, 14:00-15:00 (UTC+8)

**Venue:** Zheng Xin Building, Room 24

### About the speaker

李康伟，天津大学应用数学中心教授，2022 年获国家“优秀青年科学基金”，研究方向是调和分析，主要包括小波分析、奇异积分算子理论及其加权理论。2015 年 6 月博士毕业于南开大学，2015 年-2019 年先后在芬兰赫尔辛基大学、西班牙巴斯克应用数学中心从事博士后研究，2019 年 9 月至今在天津大学工作。已发表论文 50 余篇，部分科研成果发表在 Amer. J. Math., Adv. Math, JMPA, Math. Ann 等国际一流期刊。

More information:

<https://im.hit.edu.cn/2025/0518/c8386a370276/page.htm>

