



上海交通大学

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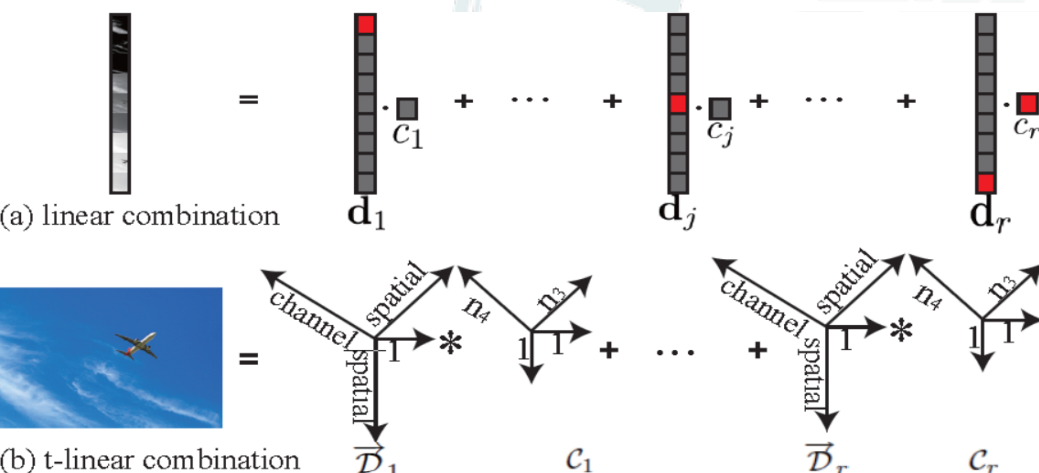


Efficient Multi-Dimensional Tensor Sparse Coding Using t-linear Combination

Fei Jiang, Xiao-Yang Liu, Hongtao Lu, Ruimin Shen

Sparse Coding vs. Tensor Sparse Coding

Sparse Coding	Vector	Linear Combination
Tensor Sparse Coding	Tensor	Tensor-linear combination



Shortcomings of sparse coding:

- High-dimensional vector \rightarrow large dictionary \rightarrow high computational complexity
- Losing spatial structure and local proximal information

Fig.1 linear combination vs. tensor linear combination



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Tensor-linear Combination \rightarrow small-size dictionary & shifting invariance

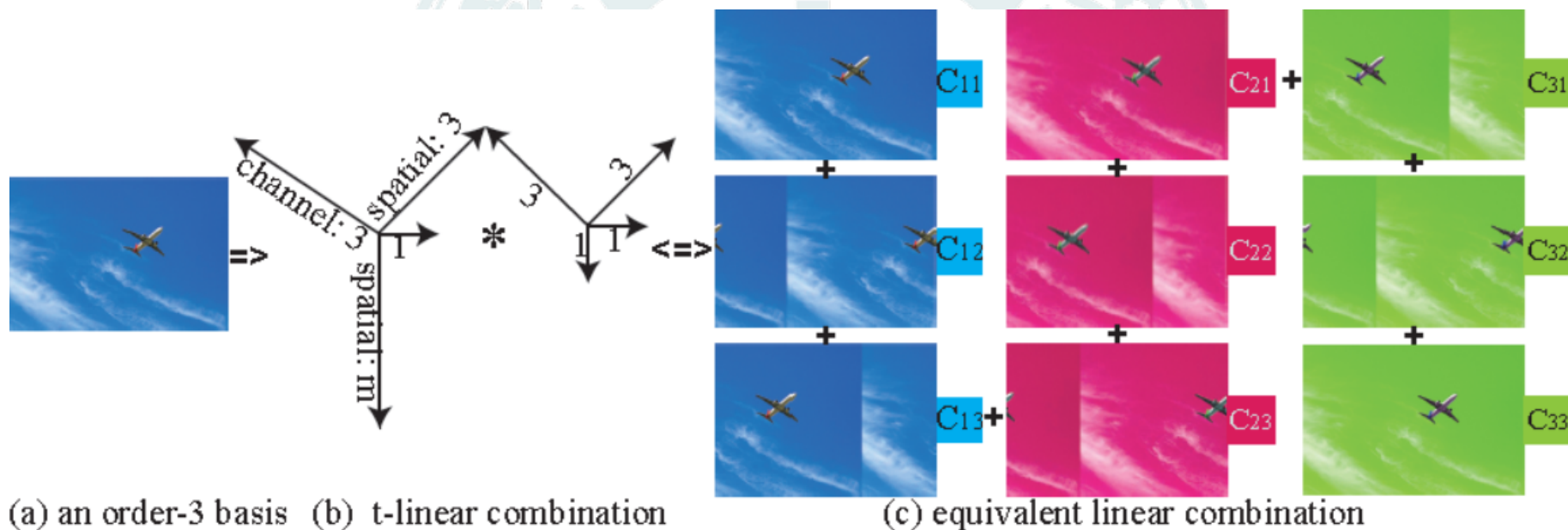


Fig.2 Equivalence between t-linear combination and linear combination. The bases on the right are Shifted versions of the leftmost basis, including spatial shifting and channel shifting.