Algebraic structures in deep learning

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Exploiting the structure of data is a key component for successful generalization in deep learning that has surpassed limitations predicted by conventional machine learning and statistical learning theory. Properties of symmetries and scale separability of data are captured by algebraic structures and their representations guide the construction of invariant and equivariant models, useful to deep learning. In the first part of this talk we will survey some of the modelling trends in this direction. Then, we will explore the learning algorithms used for training the models and present preliminary results on how they might benefit from imposing algebraic structures on data. The first part of the talk will be based on arXiv:2104.13478.