

Graph Neural Networks Do Not Always Oversmooth

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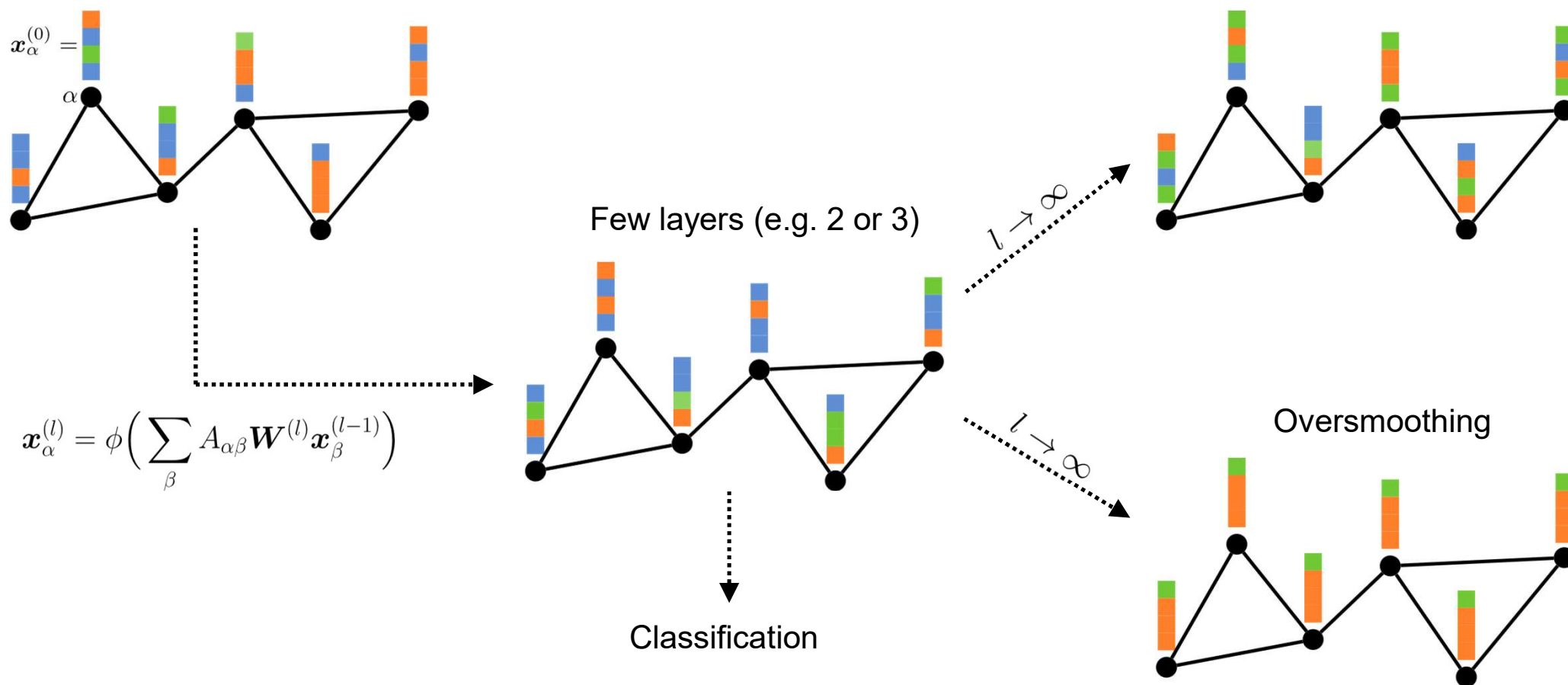
SFB 1481
Sparsity and
Singular Structures



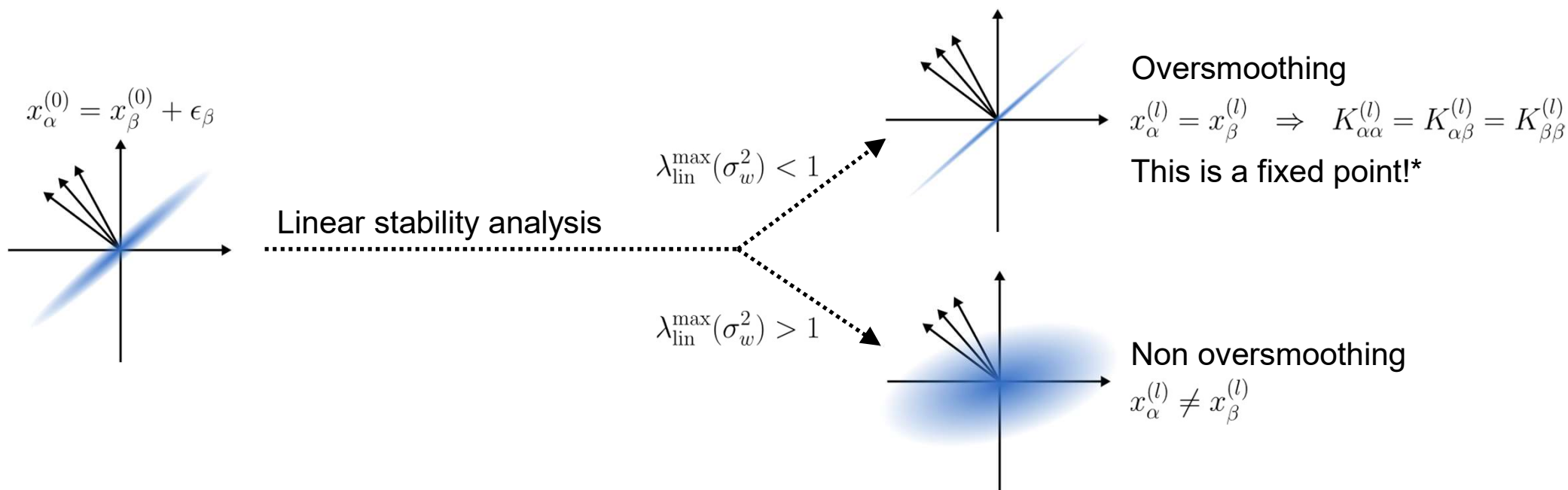
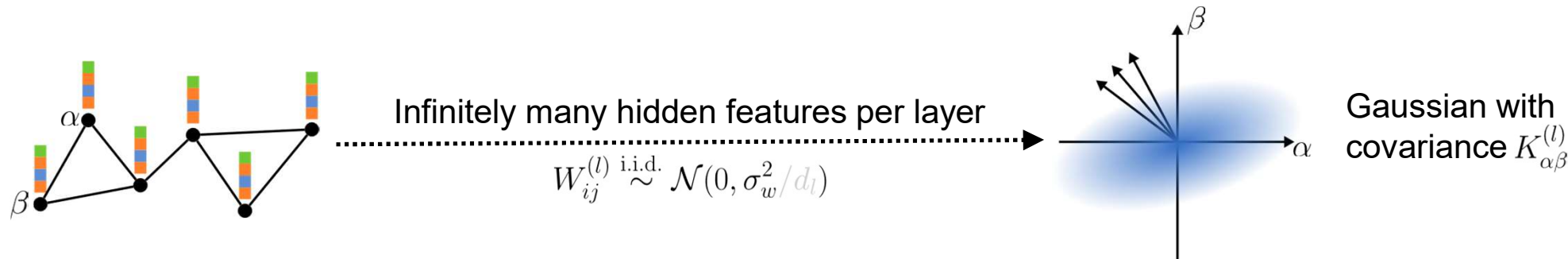
Computational
Network Science

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Oversmoothing [1] in graph convolutional networks [2]

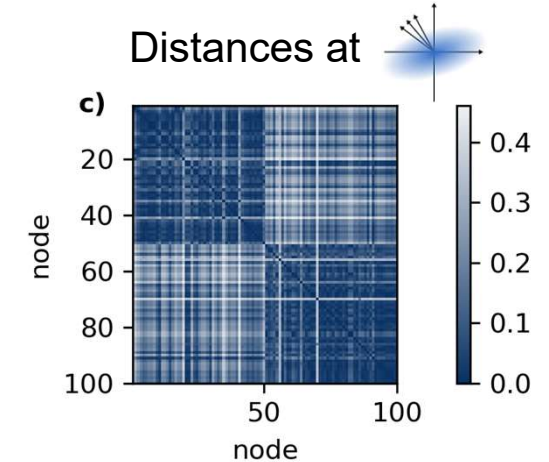
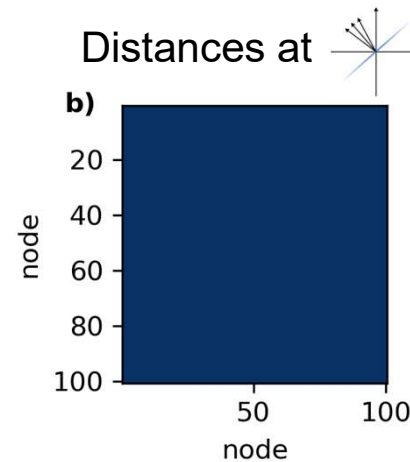
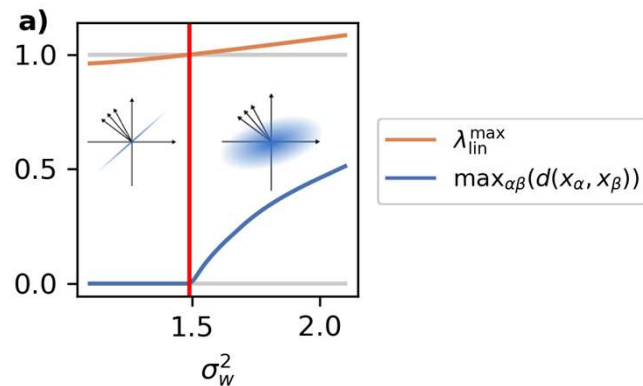


Gaussian process equivalence [3]

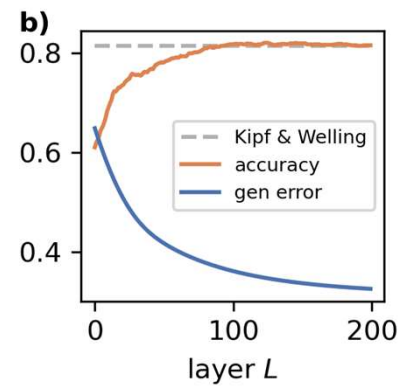
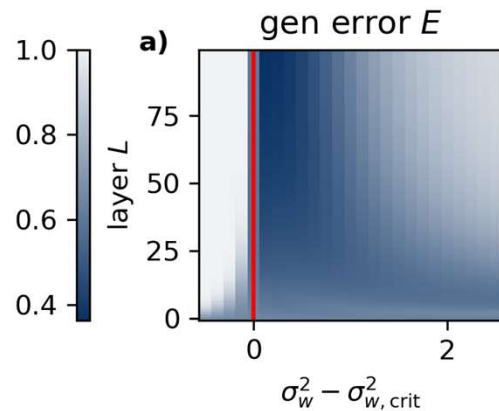


Non-oversmoothing graph neural networks

- Feature distances in a stochastic block model



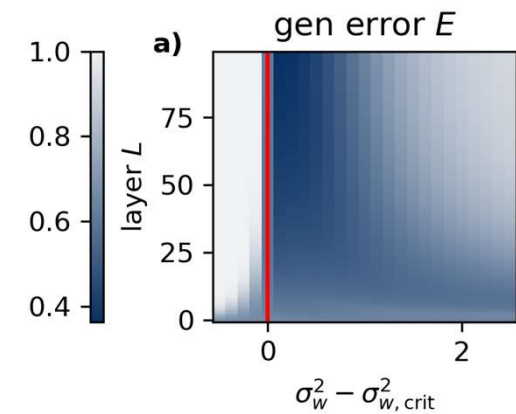
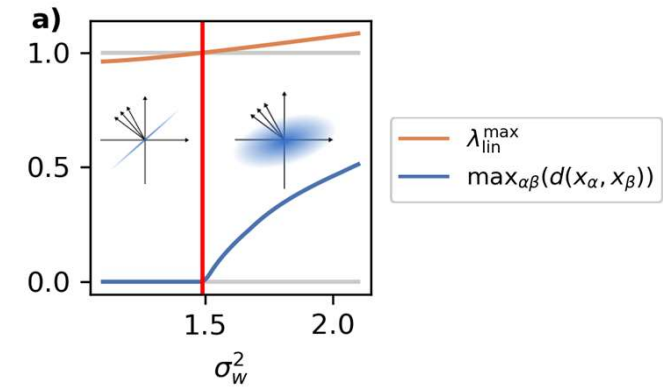
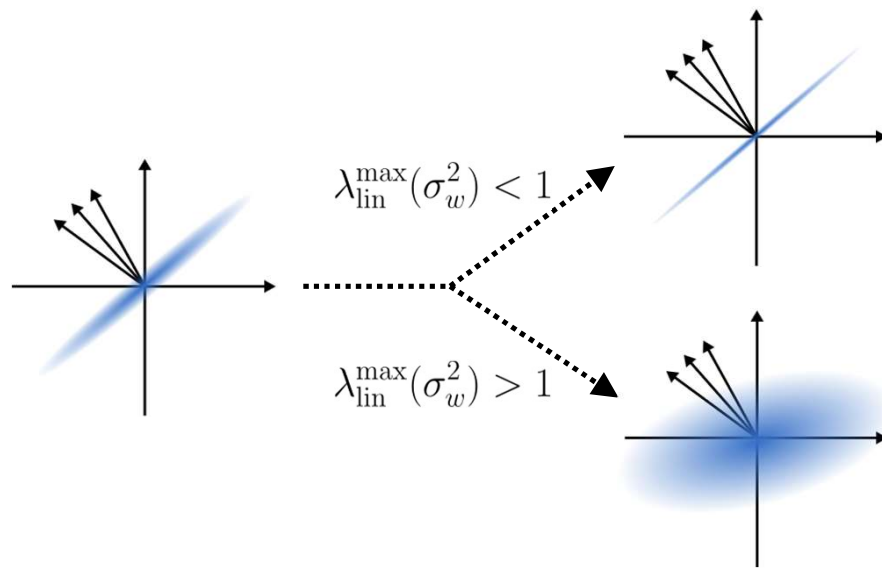
- Performance on Cora



↘
Larger weight
variances increase
feature distances

↘
Non-oversmoothing networks
are expressive for many
layers near the transition

Summary



See you in the poster session!