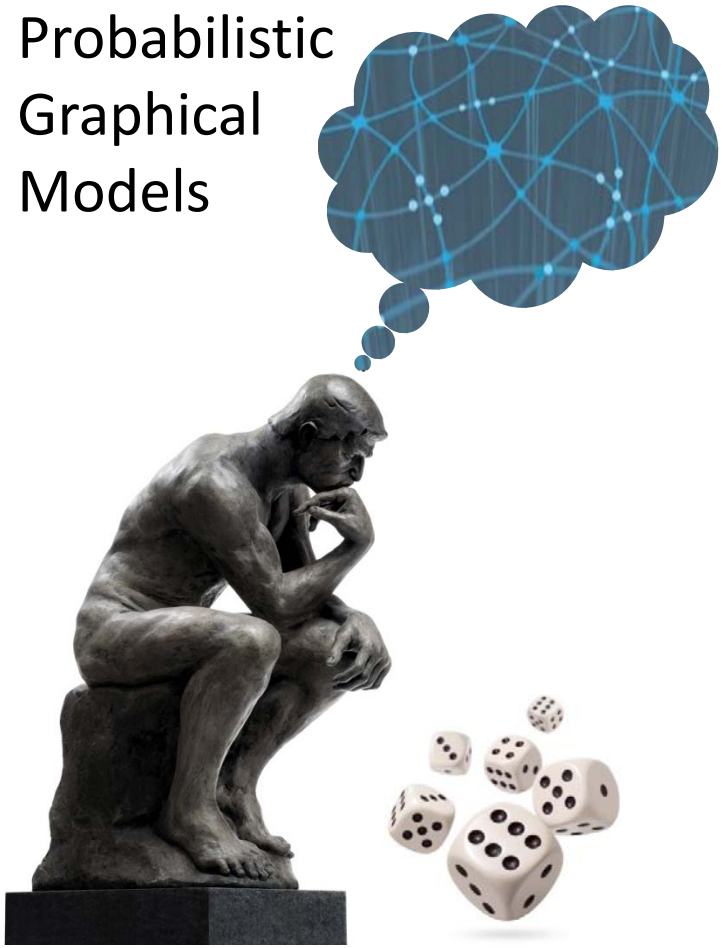
Probabilistic Graphical Models

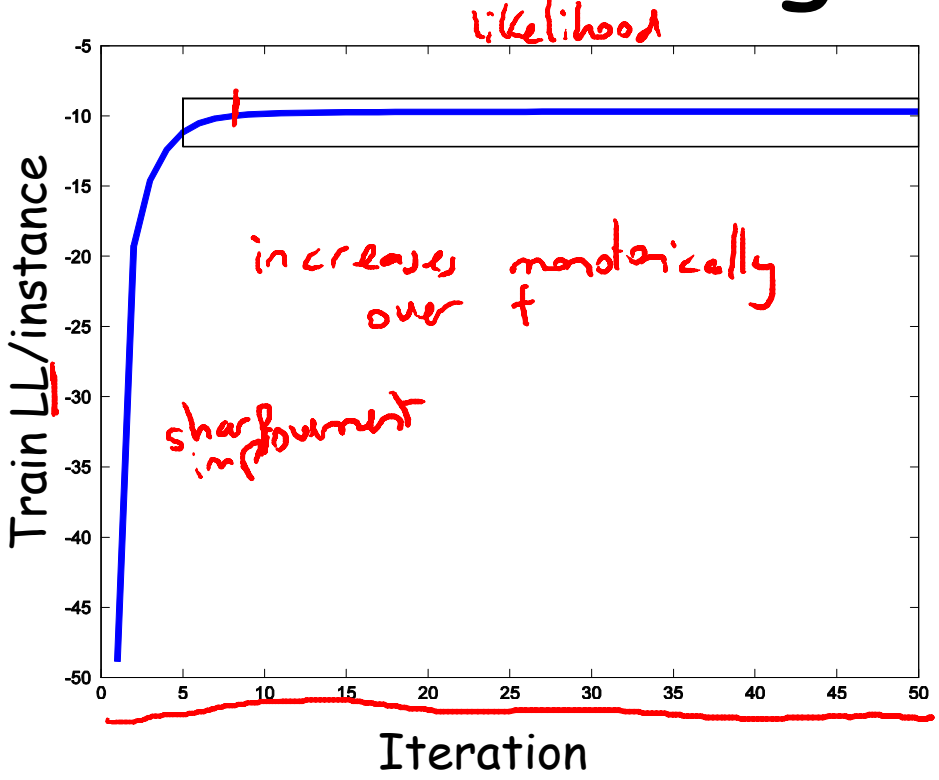


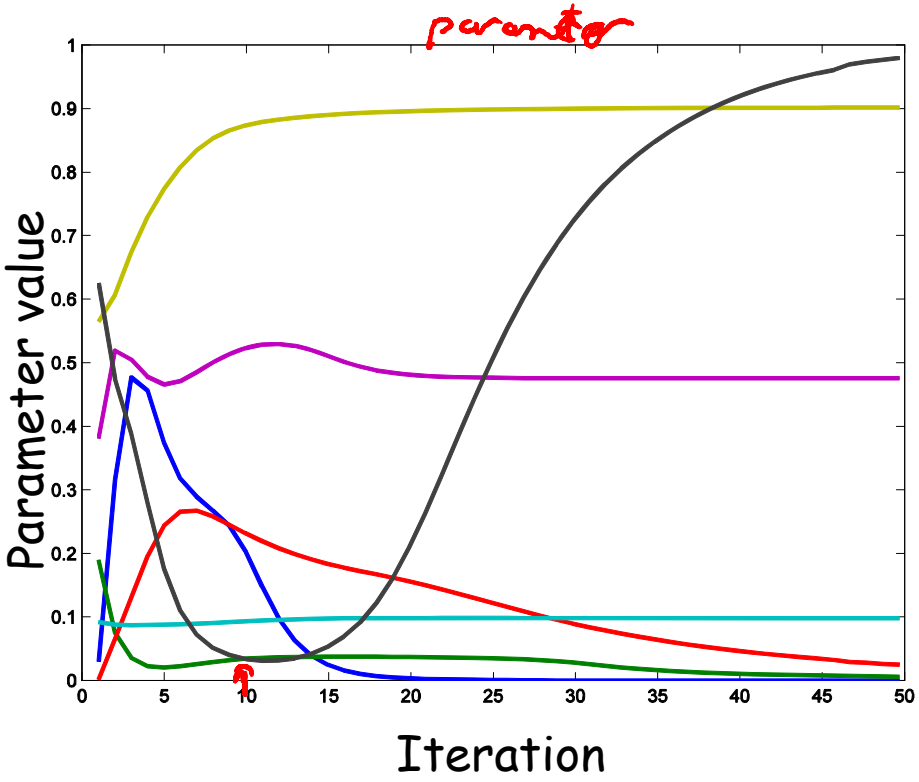
Learning

Incomplete Data

EM in Practice

EM Convergence in Practice





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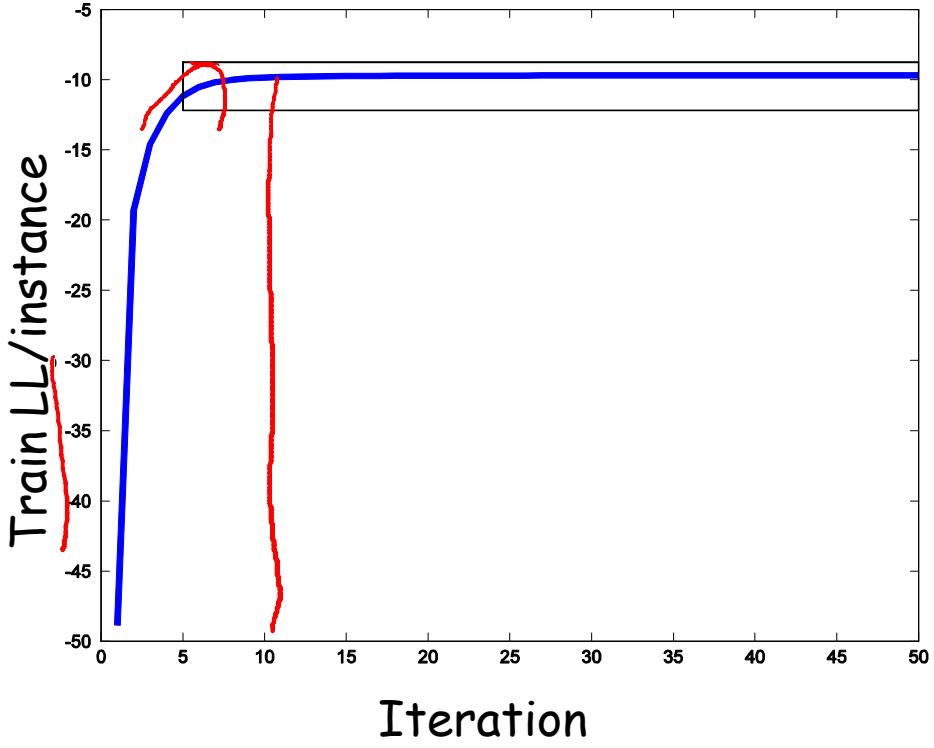
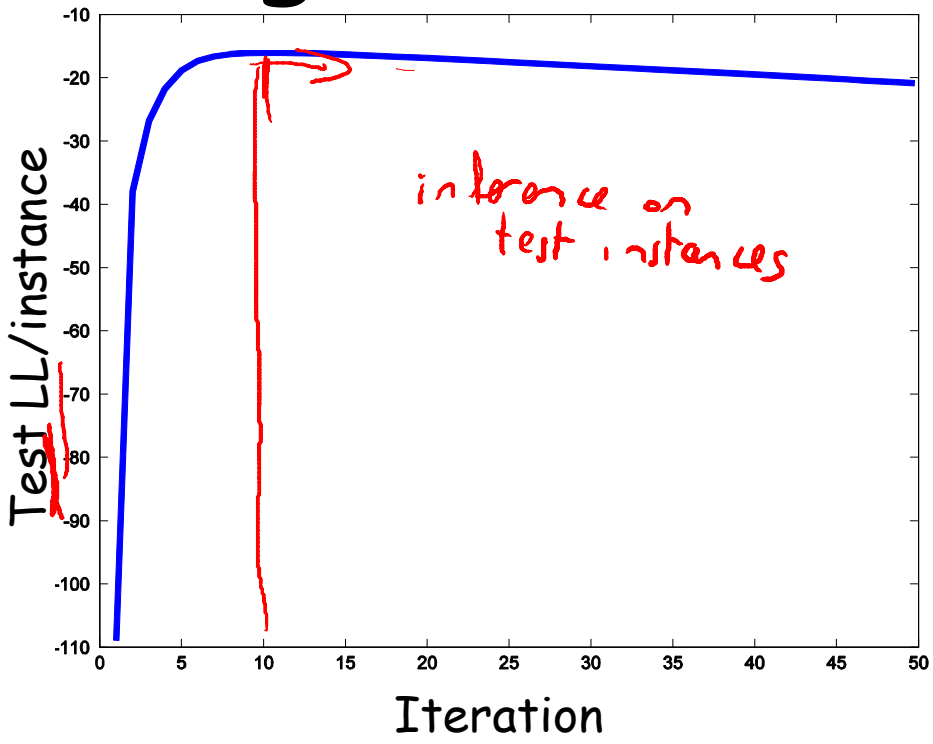
Overfitting (numerical)





- Early stopping using cross validation
- Use MAP with parameter priors rather than MLE

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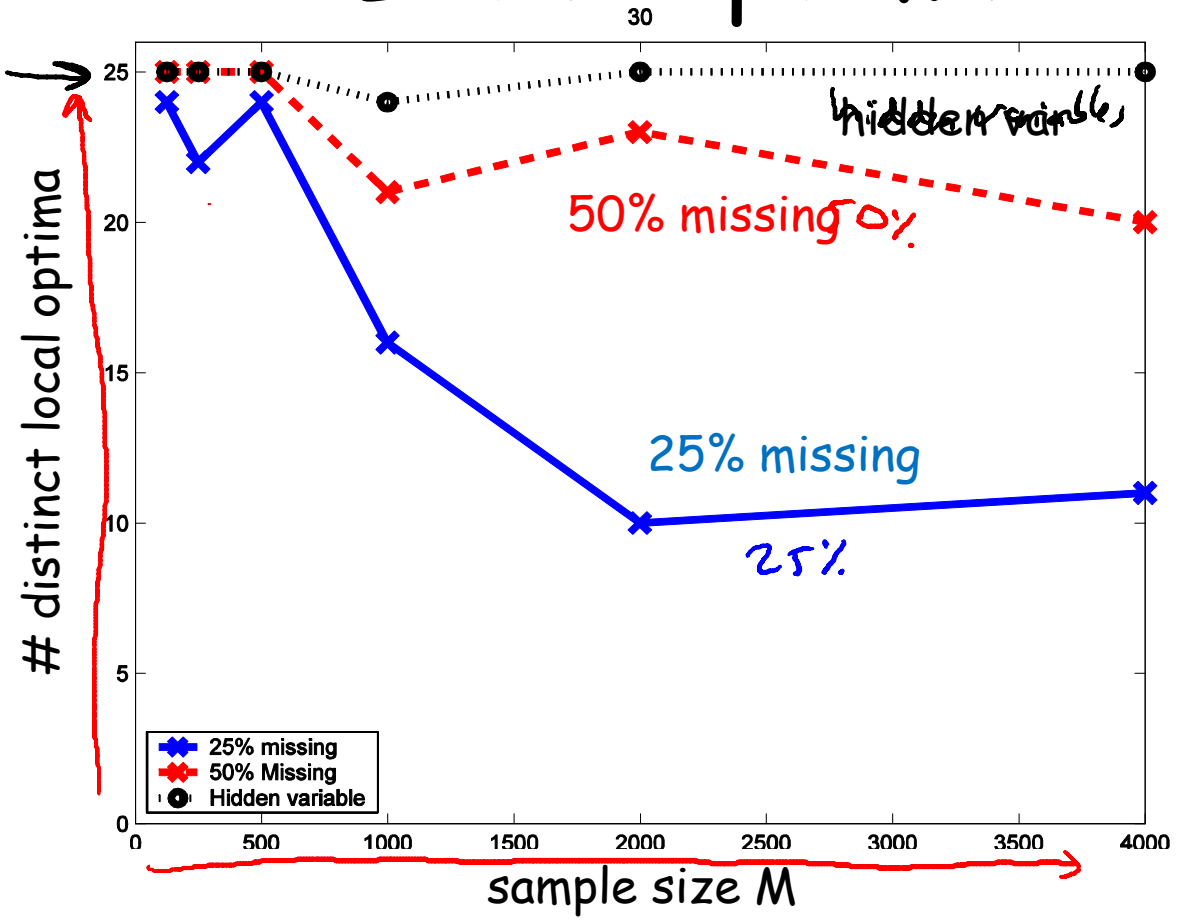
Local Optima



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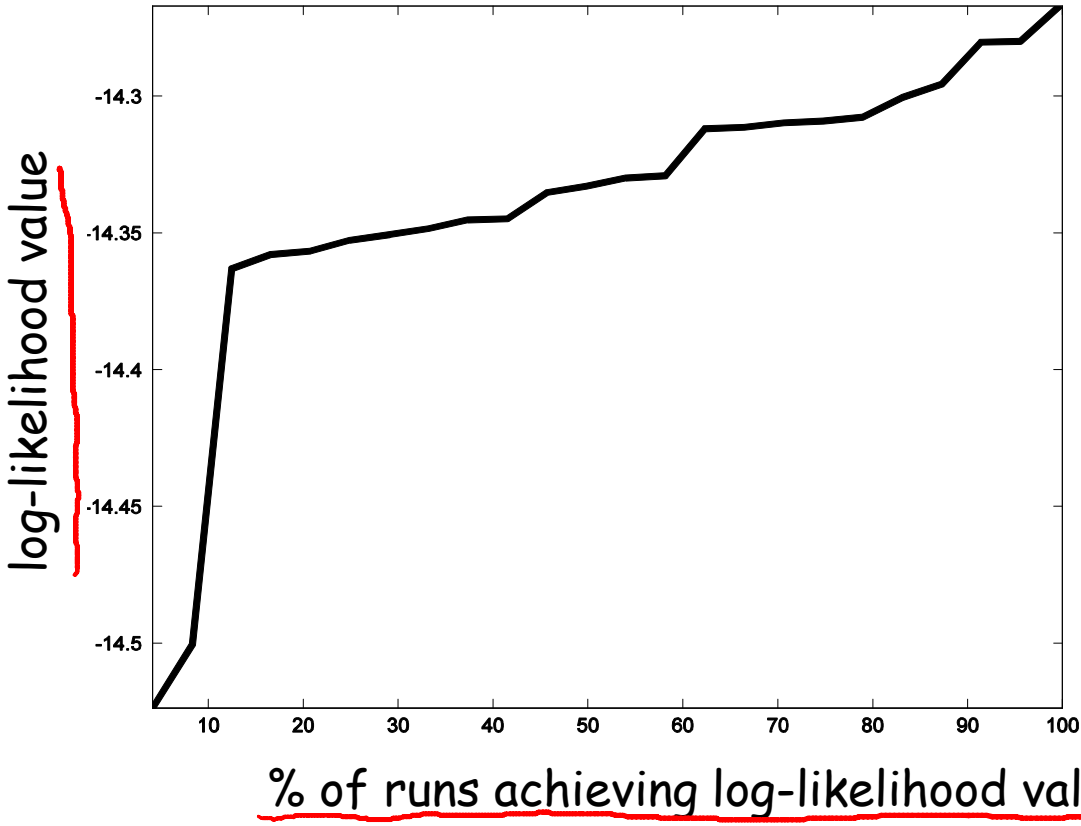
Significance of Local Optima



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Initialization is Critical

- Multiple random restarts
- From prior knowledge
- From the output of a simpler algorithm

clustering (k-means, hierarchical agglomerative clustering)

Summary

- Convergence of likelihood ≠ convergence of parameters
- Running to convergence can lead to overfitting
- Local optima are unavoidable, and increase with the amount of missing data
- Local optima can be very different
- Initialization is critical