E9 205 Machine Learning for Signal Processing

EM Algorithm

For Mixture Gaussian Models

11-09-2019

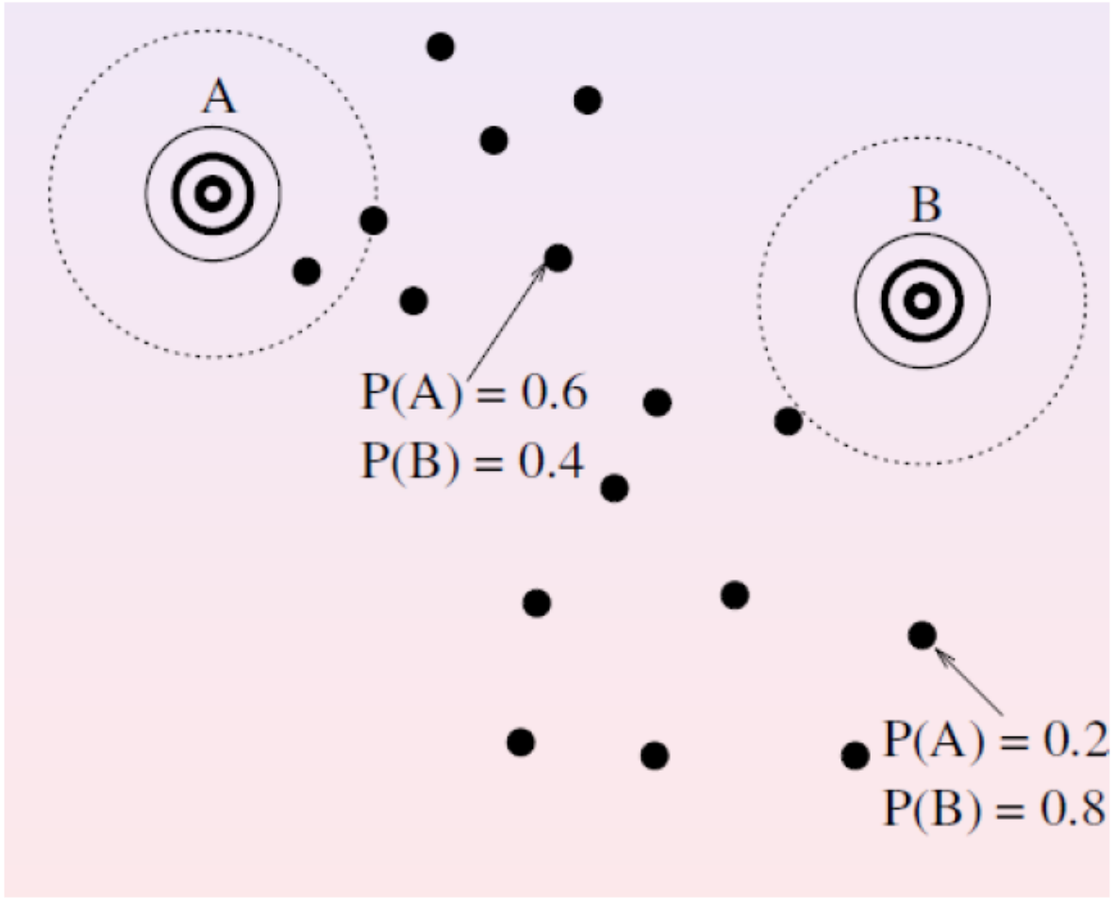
Instructor - Sriram Ganapathy (sriramg@iisc.ac.in)

Teaching Assistant - Prachi Singh (prachisingh@iisc.ac.in).

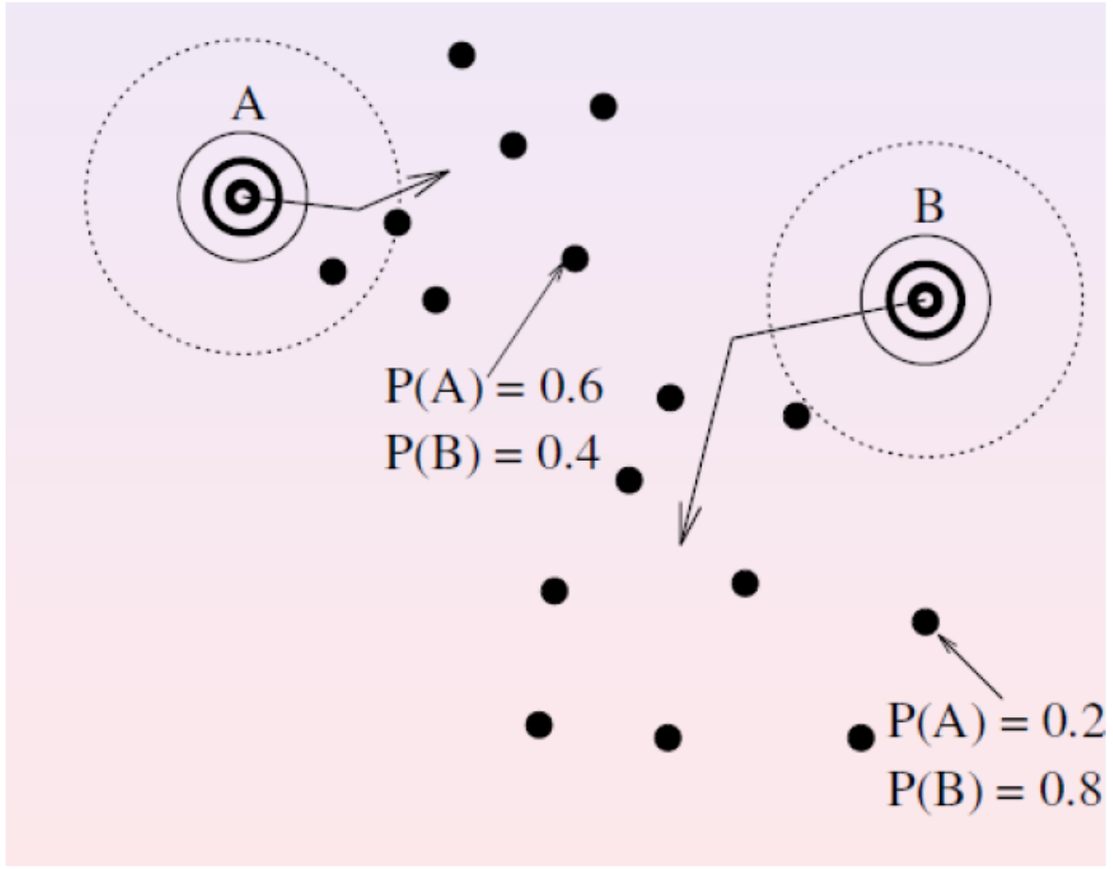
EM Algorithm For GMMs

EM Algorithm for GMM

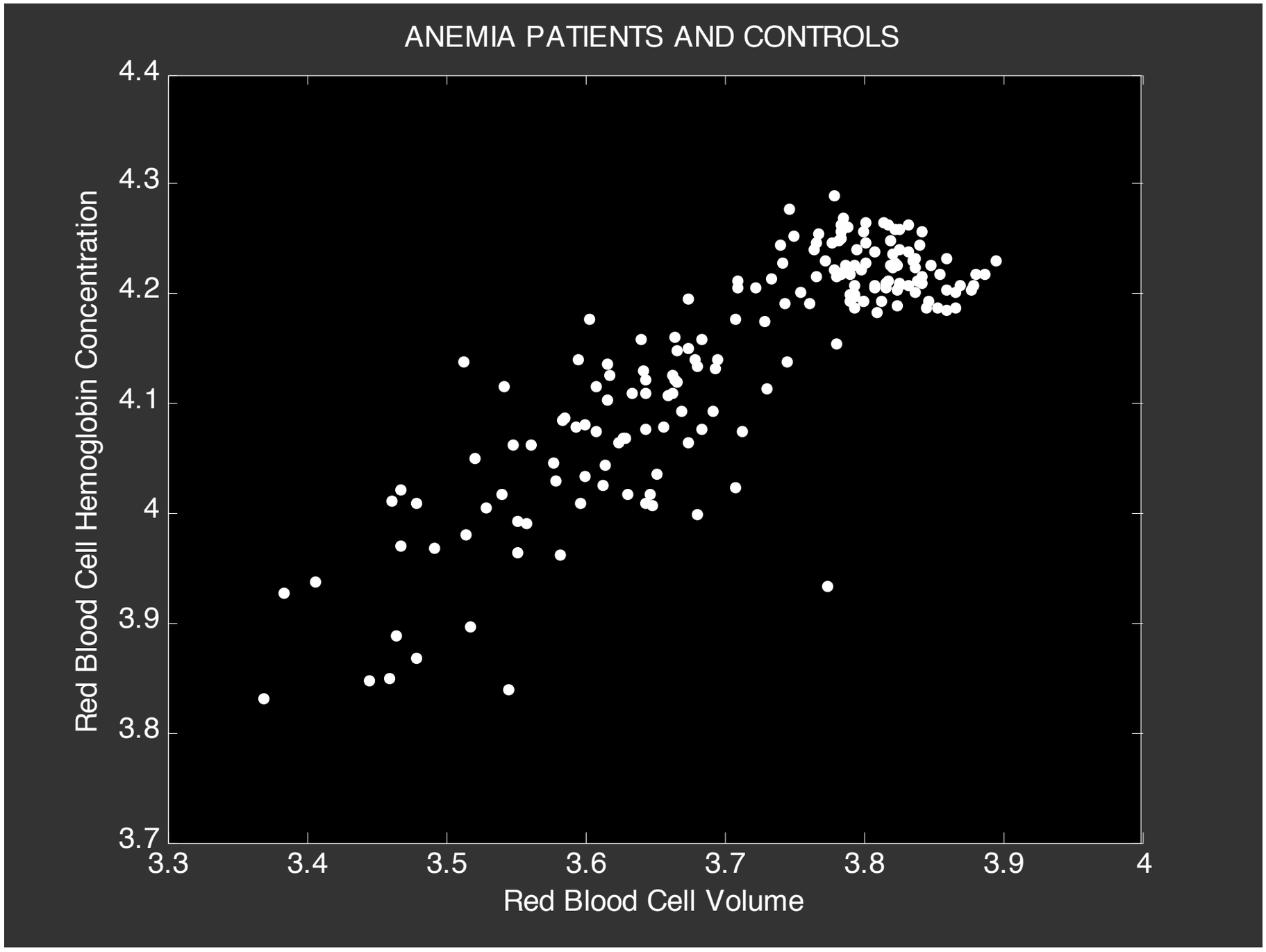
E-step



M-step



EM Algorithm for GMM



Cadez, Igor V., et al. "Hierarchical models for screening of iron deficiency anemia." *ICML*. 1999.

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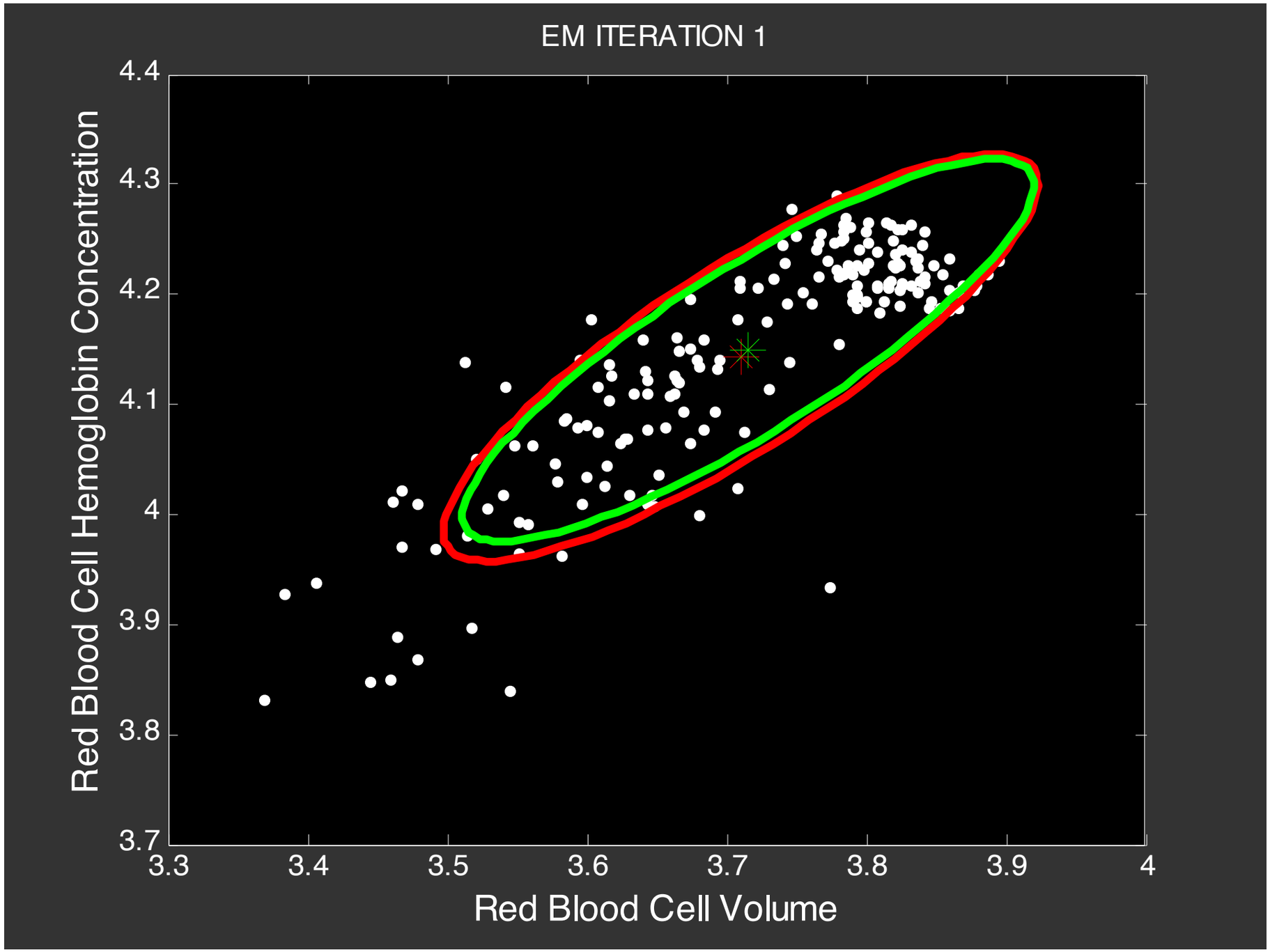

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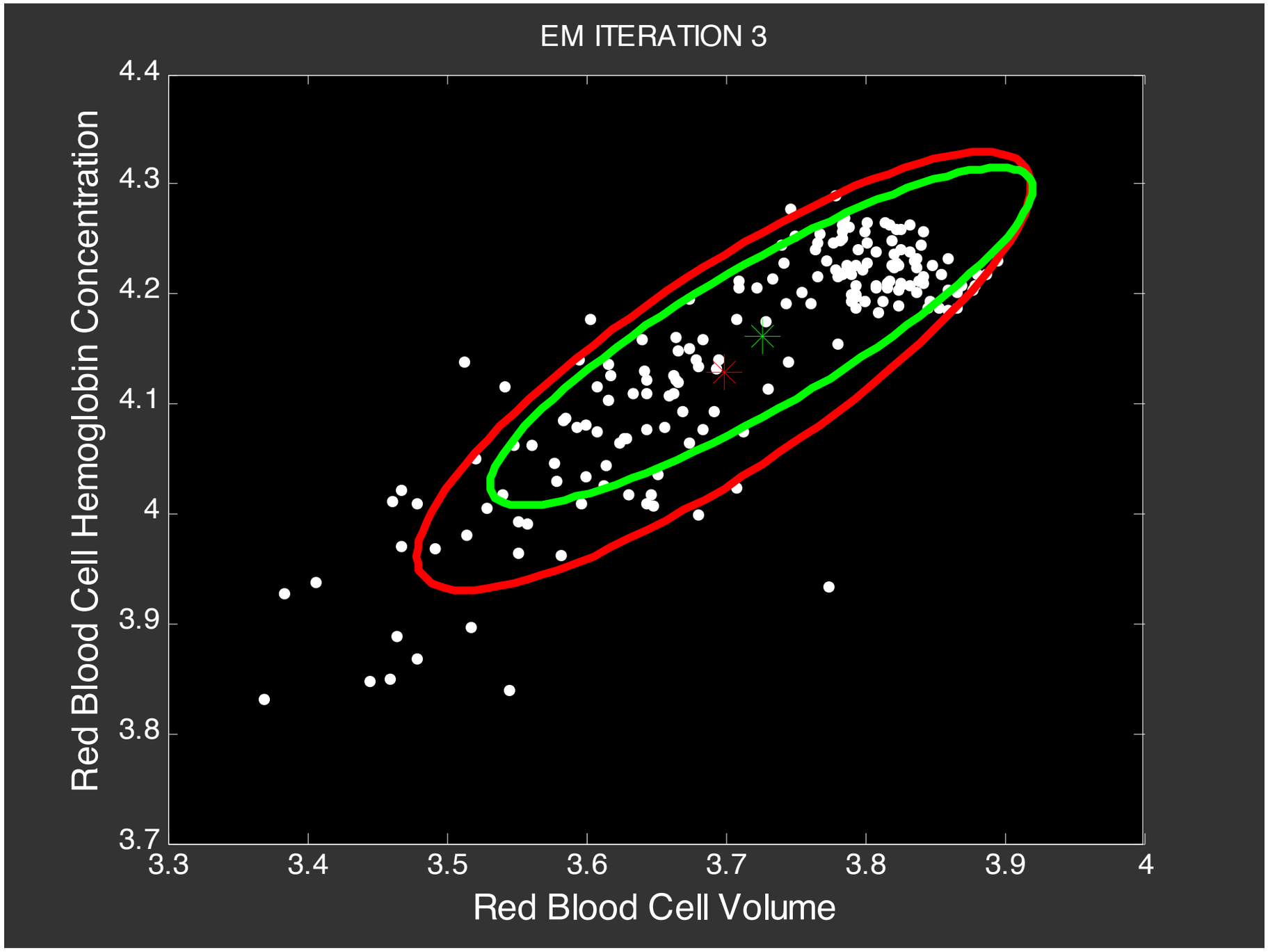

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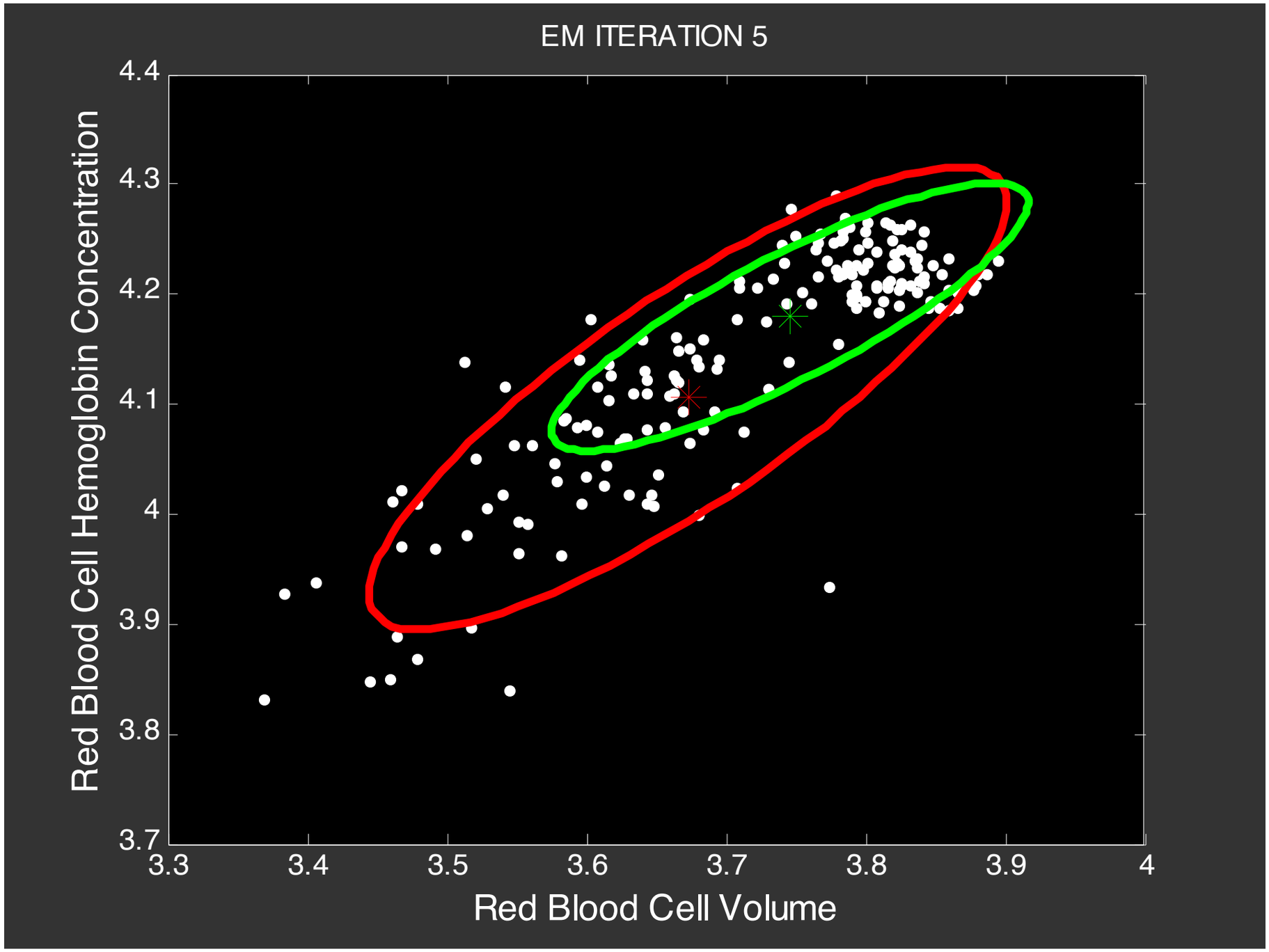

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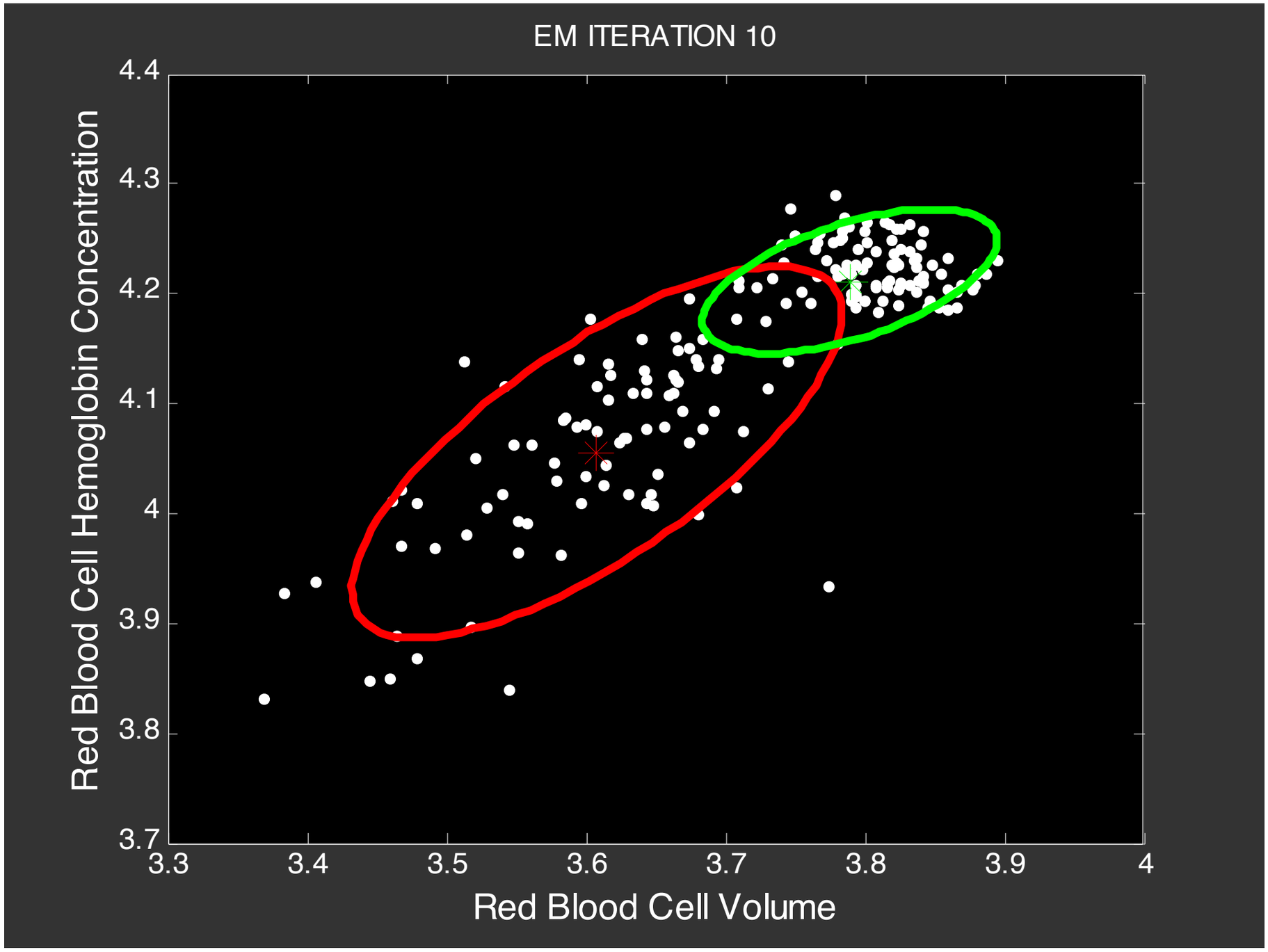

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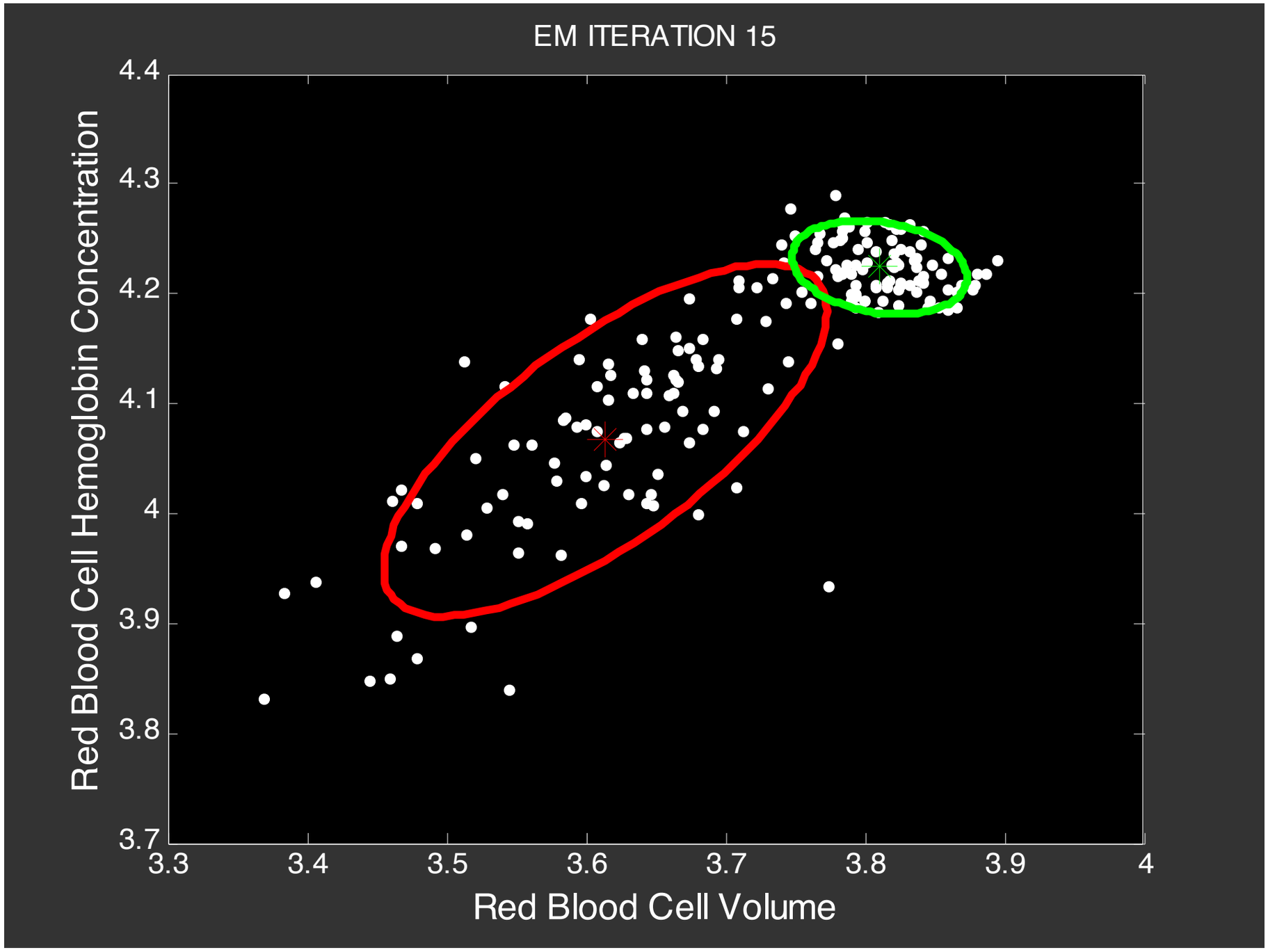

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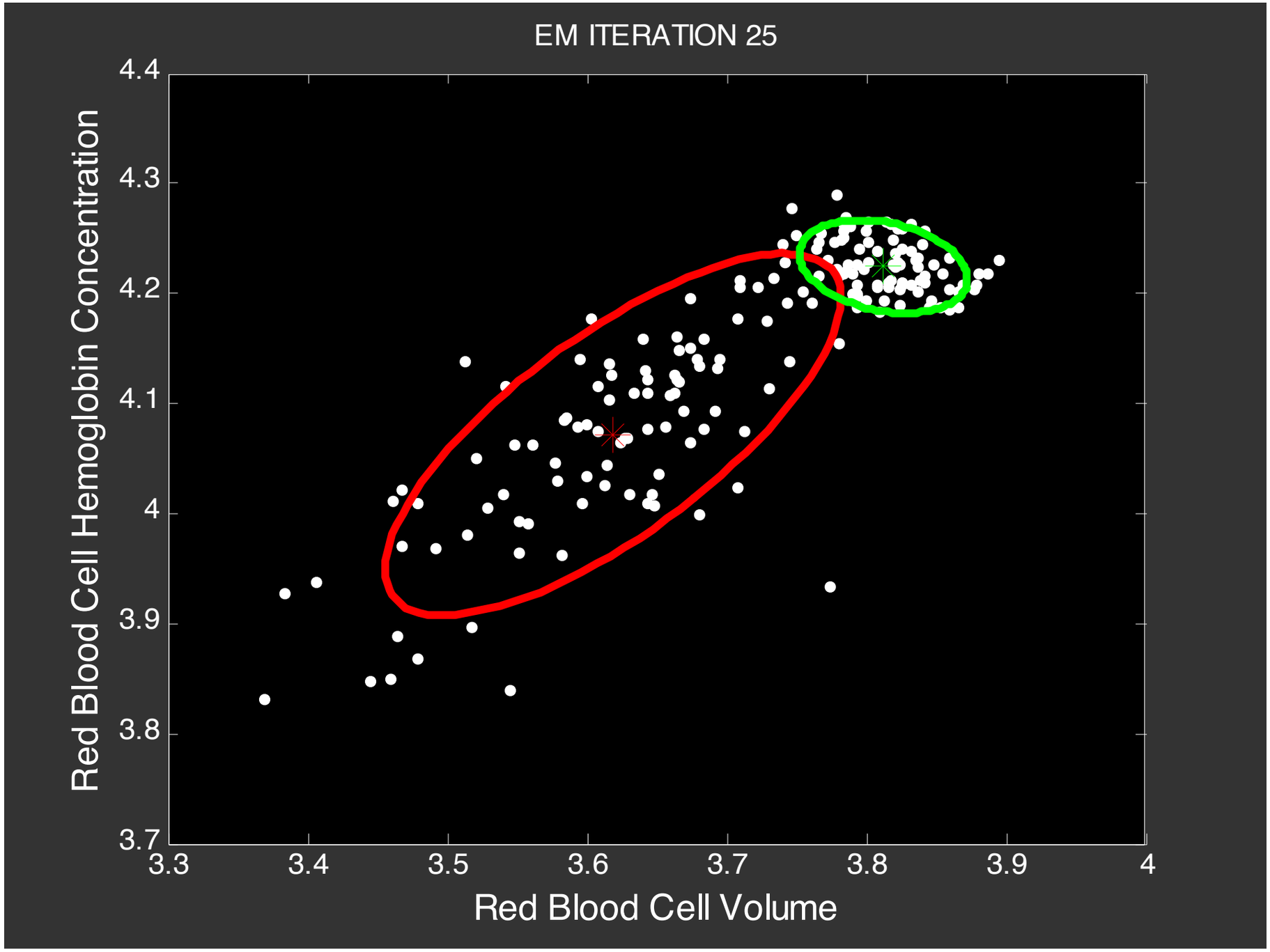

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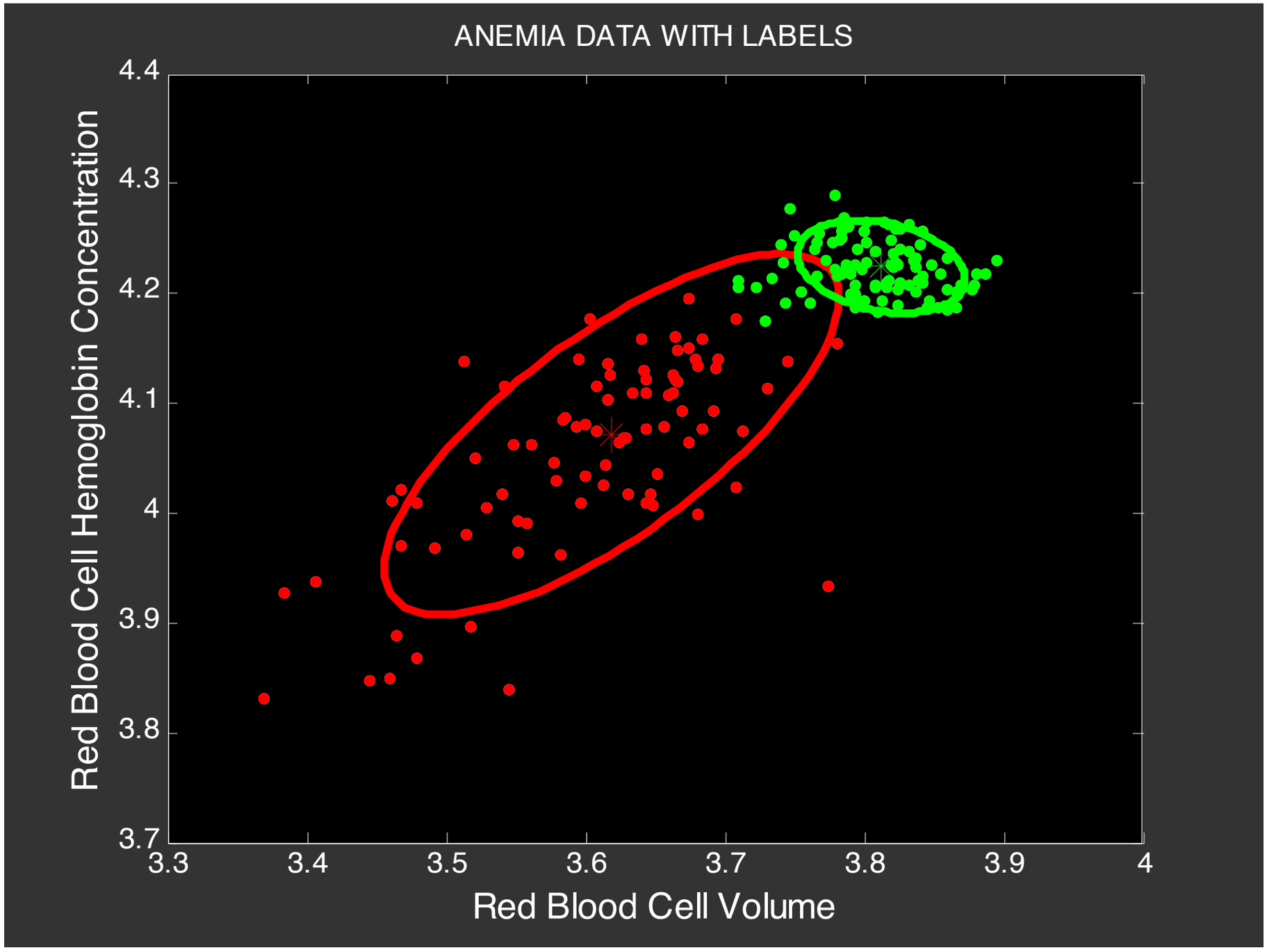

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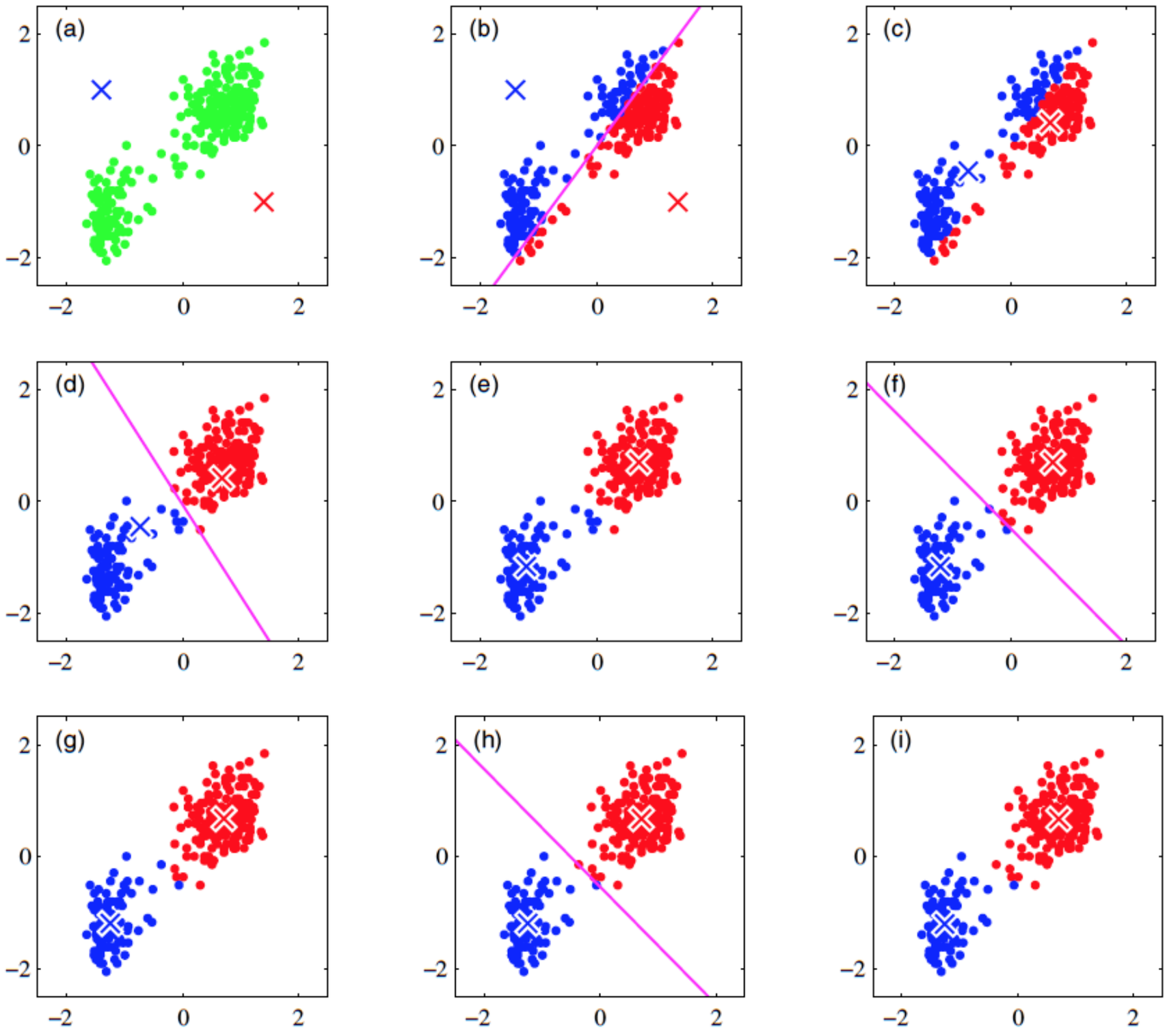
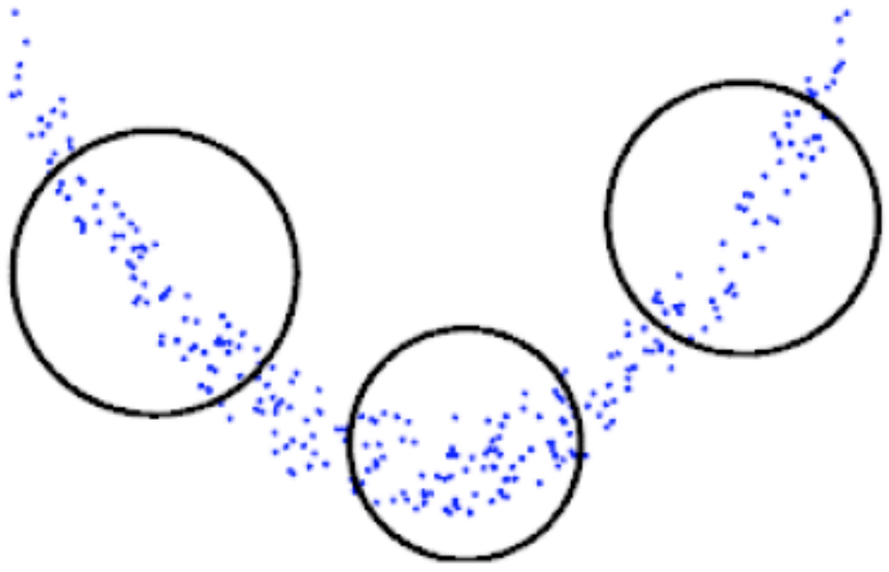
K-means Algorithm for Initialization



Other Considerations

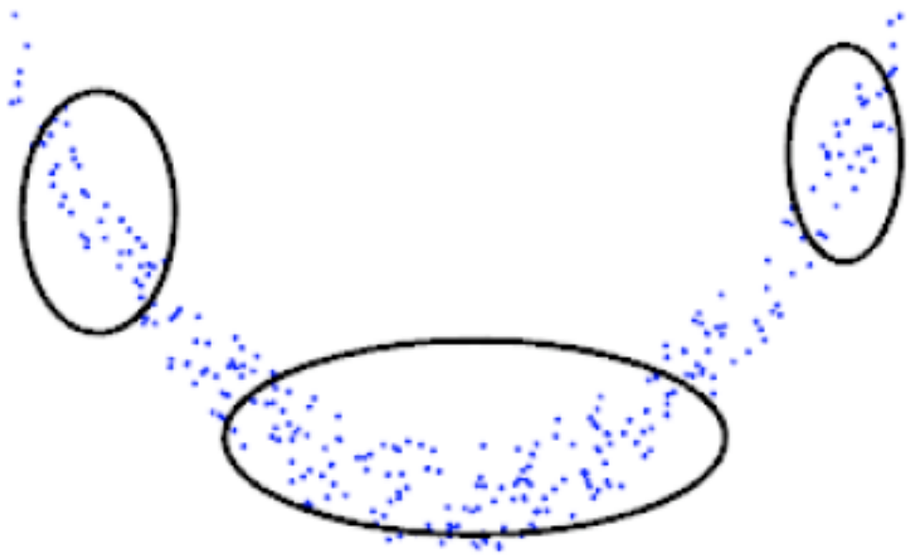
- Initialization - random or k-means
- Number of Gaussians
- Type of Covariance matrix
  - Spherical covariance



-Less precise.
-Very efficient to compute.

Other Considerations

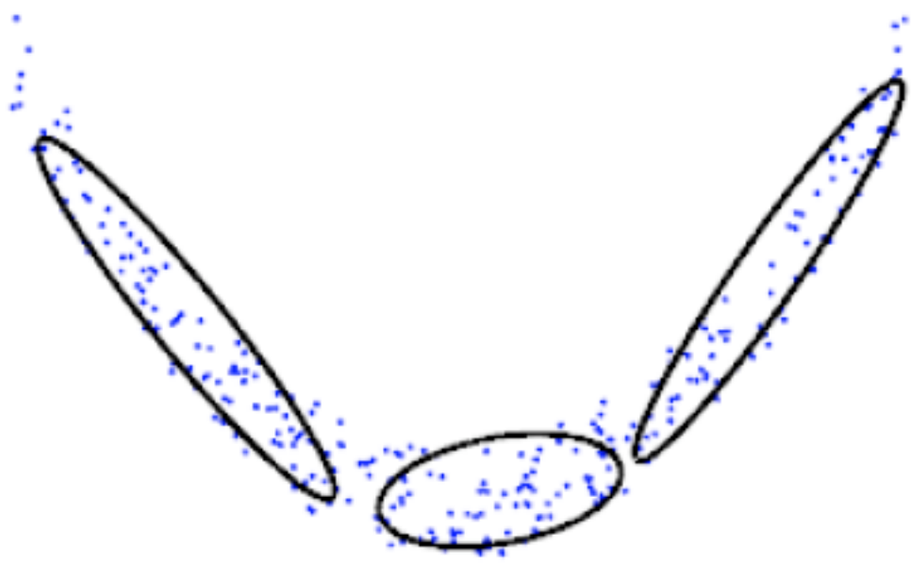
- Initialization - random or k-means
- Number of Gaussians
- Type of Covariance matrix
  - Diagonal covariance



-More precise.
-Efficient to compute.

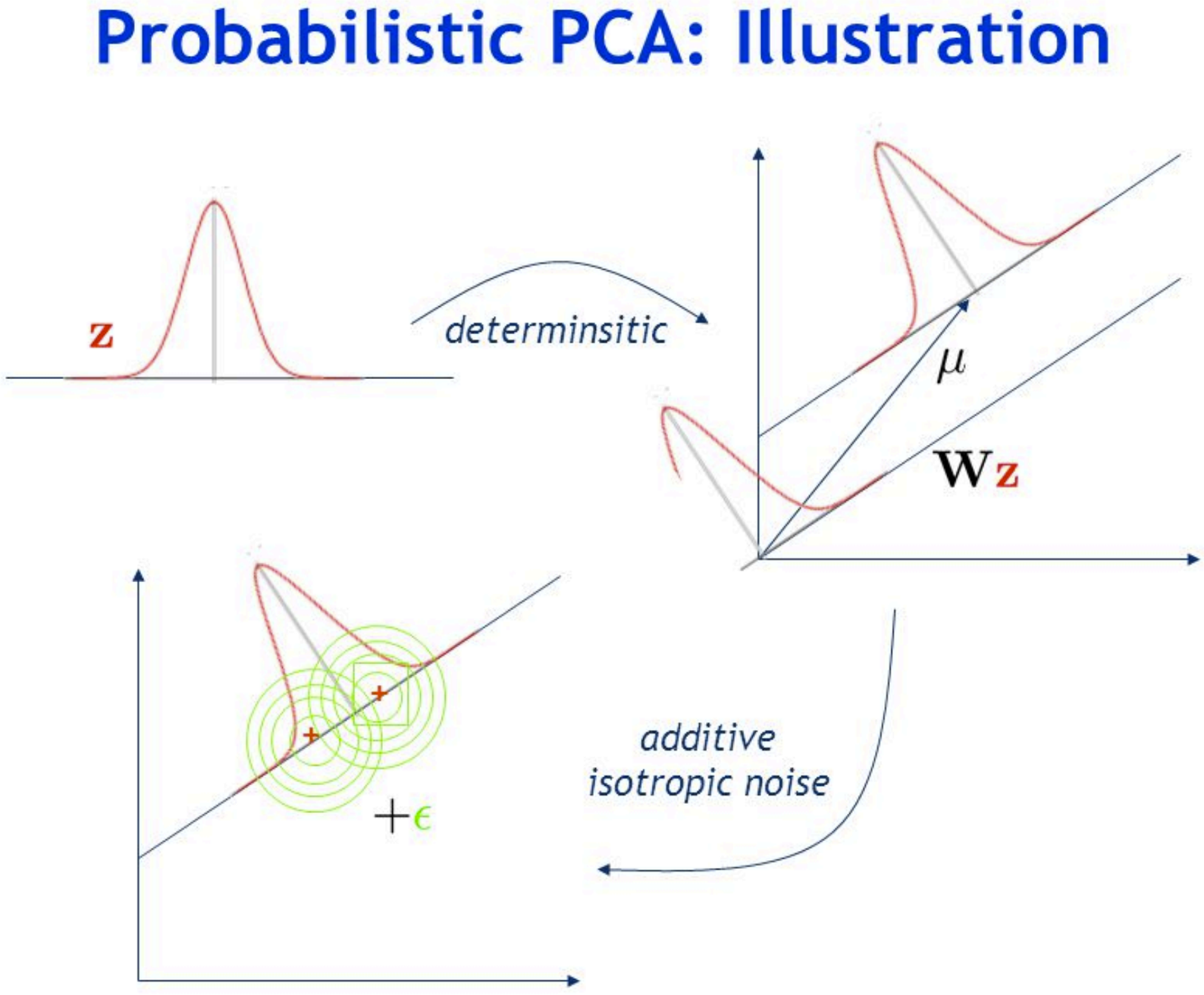
Other Considerations

- Initialization - random or k-means
- Number of Gaussians
- Type of Covariance matrix
  - Full covariance

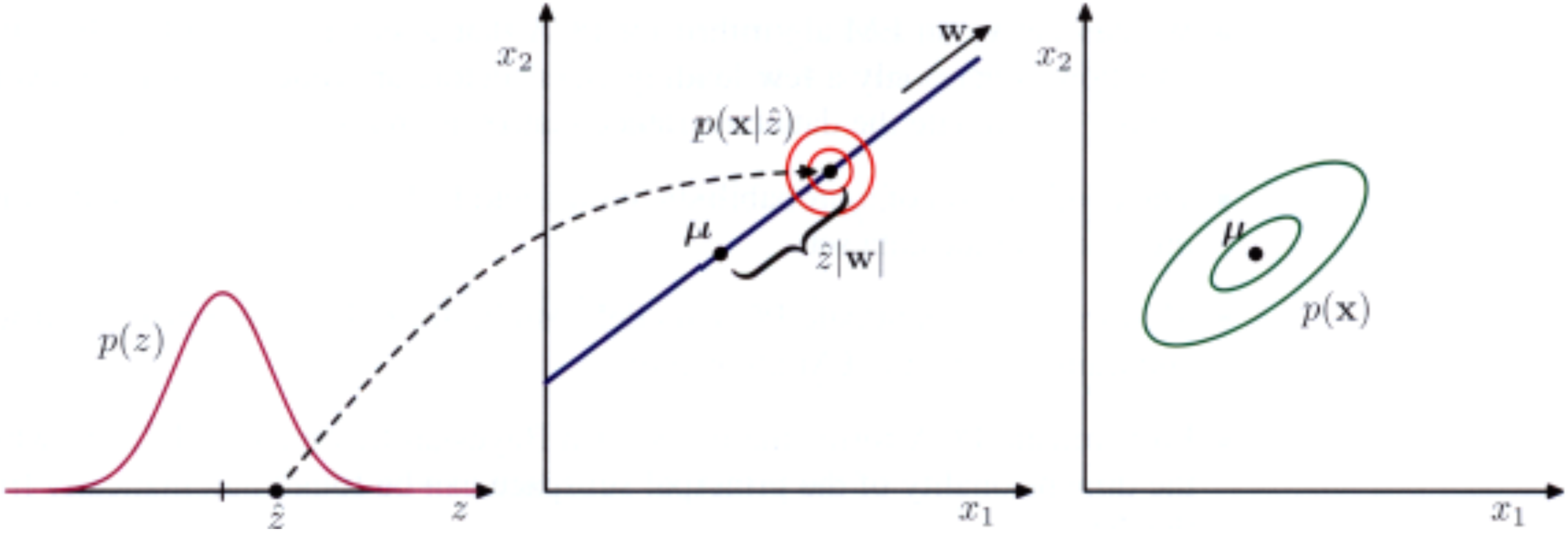


-Very precise.
-Less efficient to compute.

Probablistic PCA



1-D PPCA Example



HouseKeeping

- Assignment 2
- Mid Term Exam
- Project Topic Selection.
- Notes on Assignment 1