Banff Data Challenge 2010

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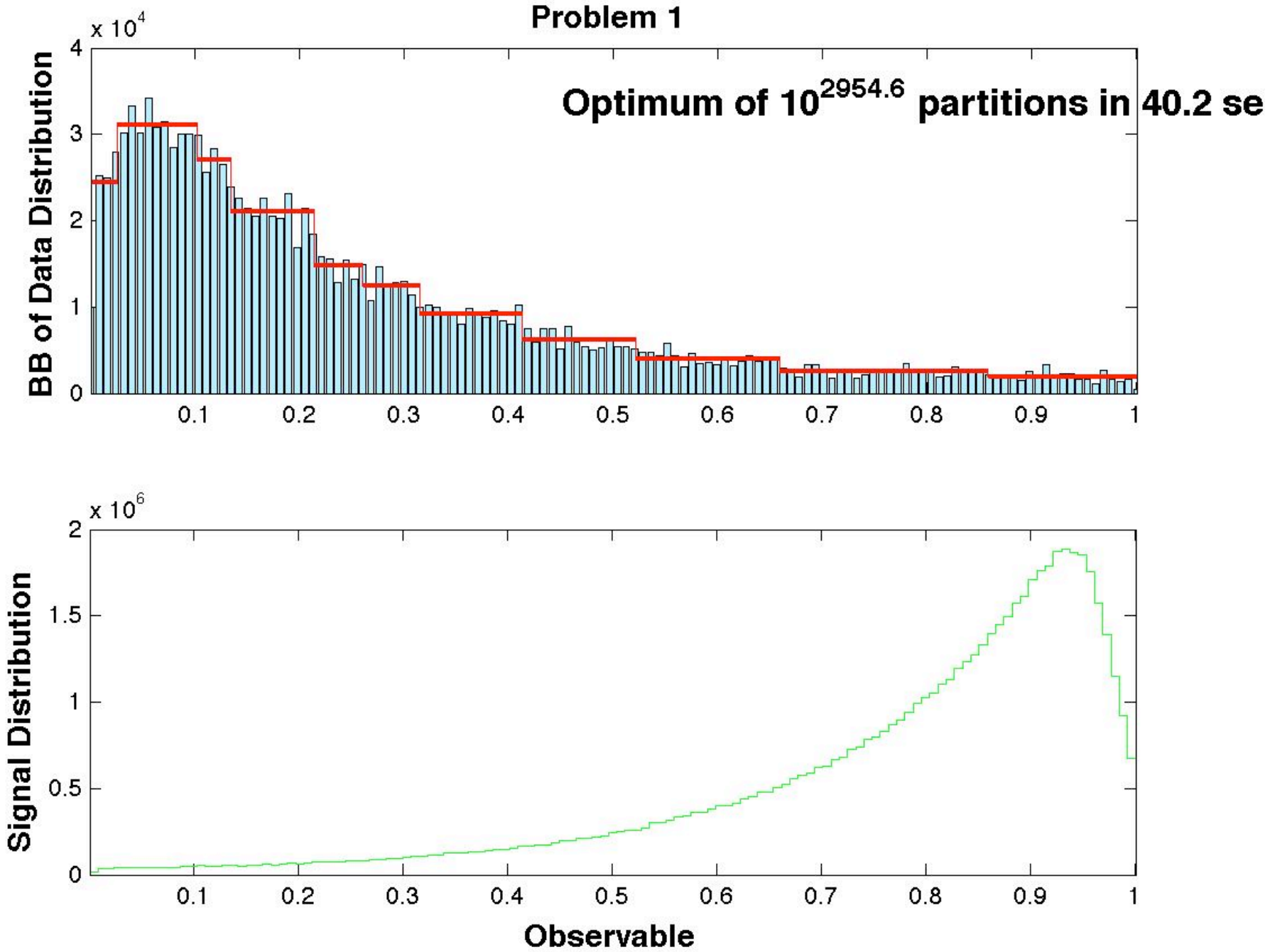
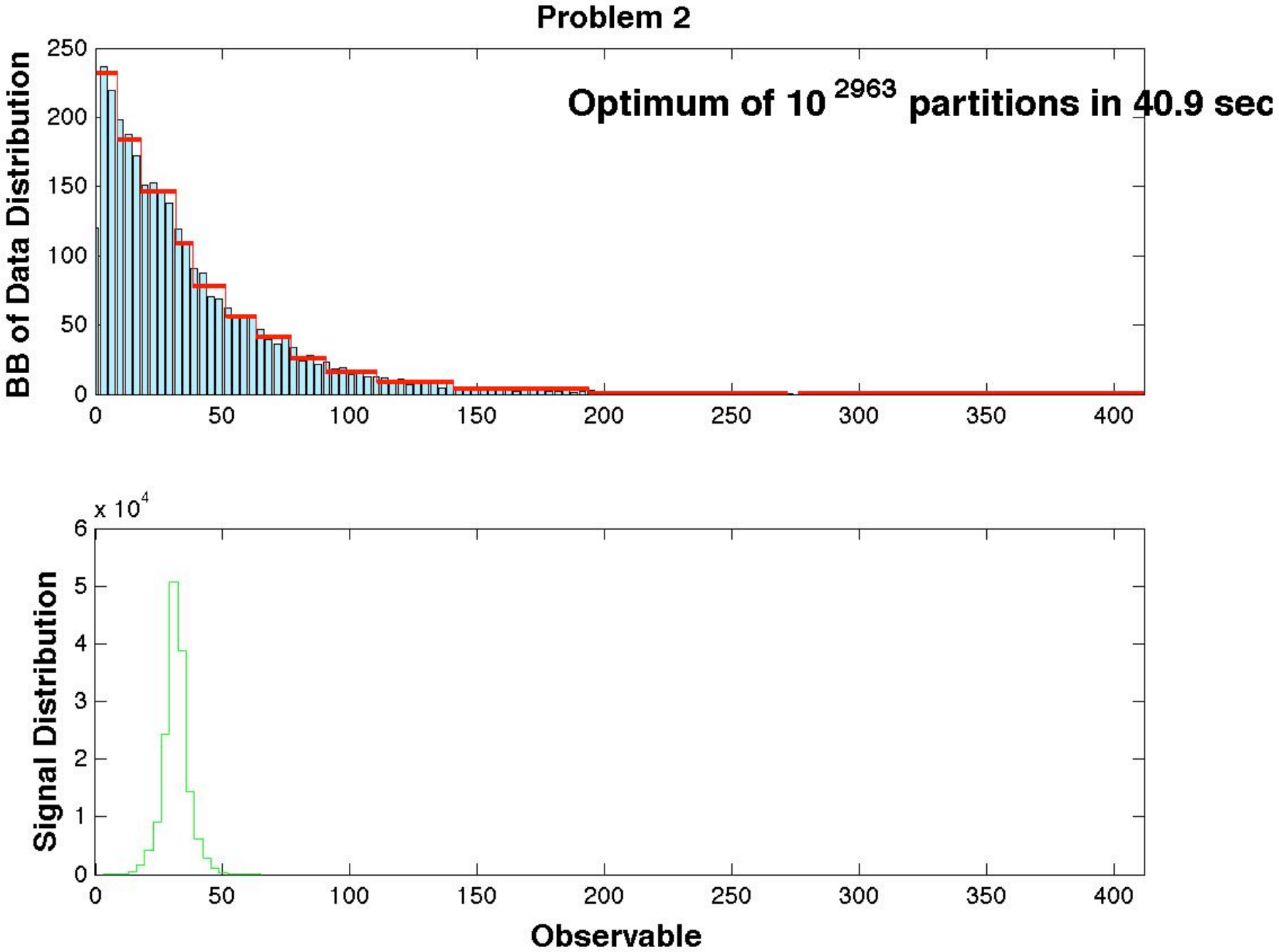
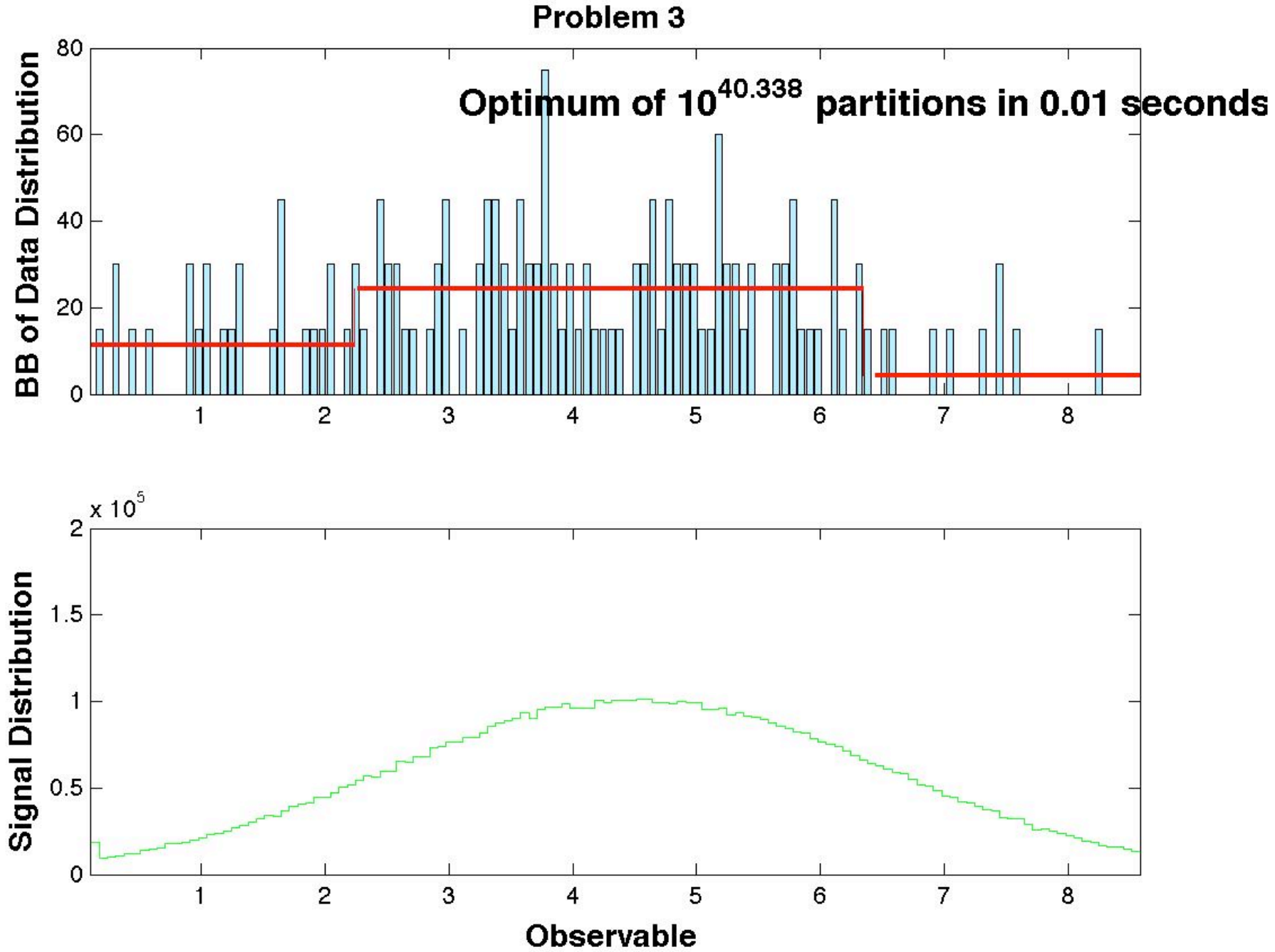
Fermi Gamma Ray Space Telescope

First step:

Do Data Adaptive Binning of Signal


Problem 1
x 10^4
BB of Data Distribution
Optimum of 10^2954.6 partitions in 40.2 se
0
1
2
3
4
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
x 10^6
Signal Distribution
0
0.5
1
1.5
2
Observable

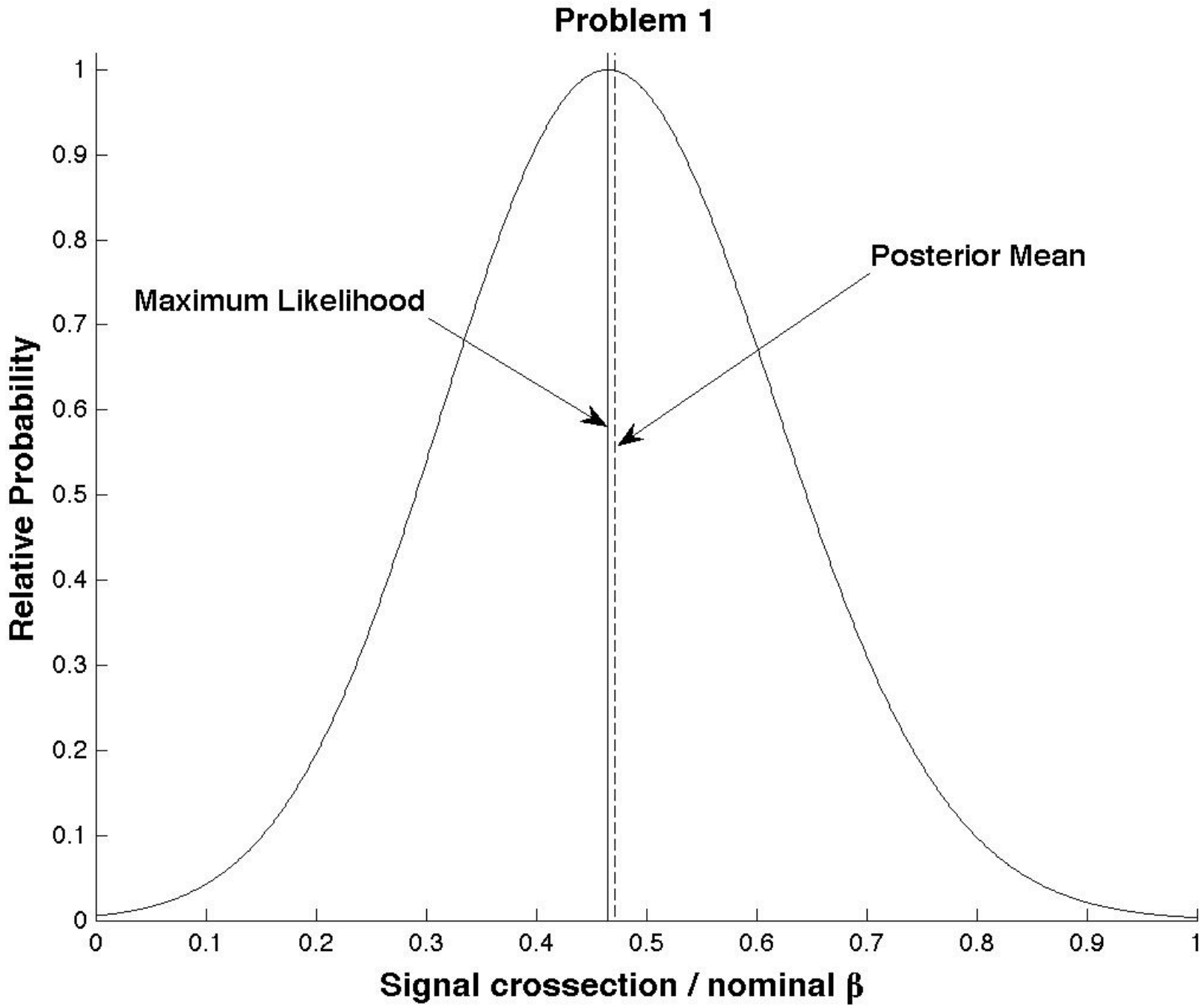

Problem 2
Optimum of 10 2963 partitions in 40.9 sec
BB of Data Distribution
0
50
100
150
200
250
300
350
400
x 10^4
Signal Distribution
0
1
2
3
4
5
6
Observable

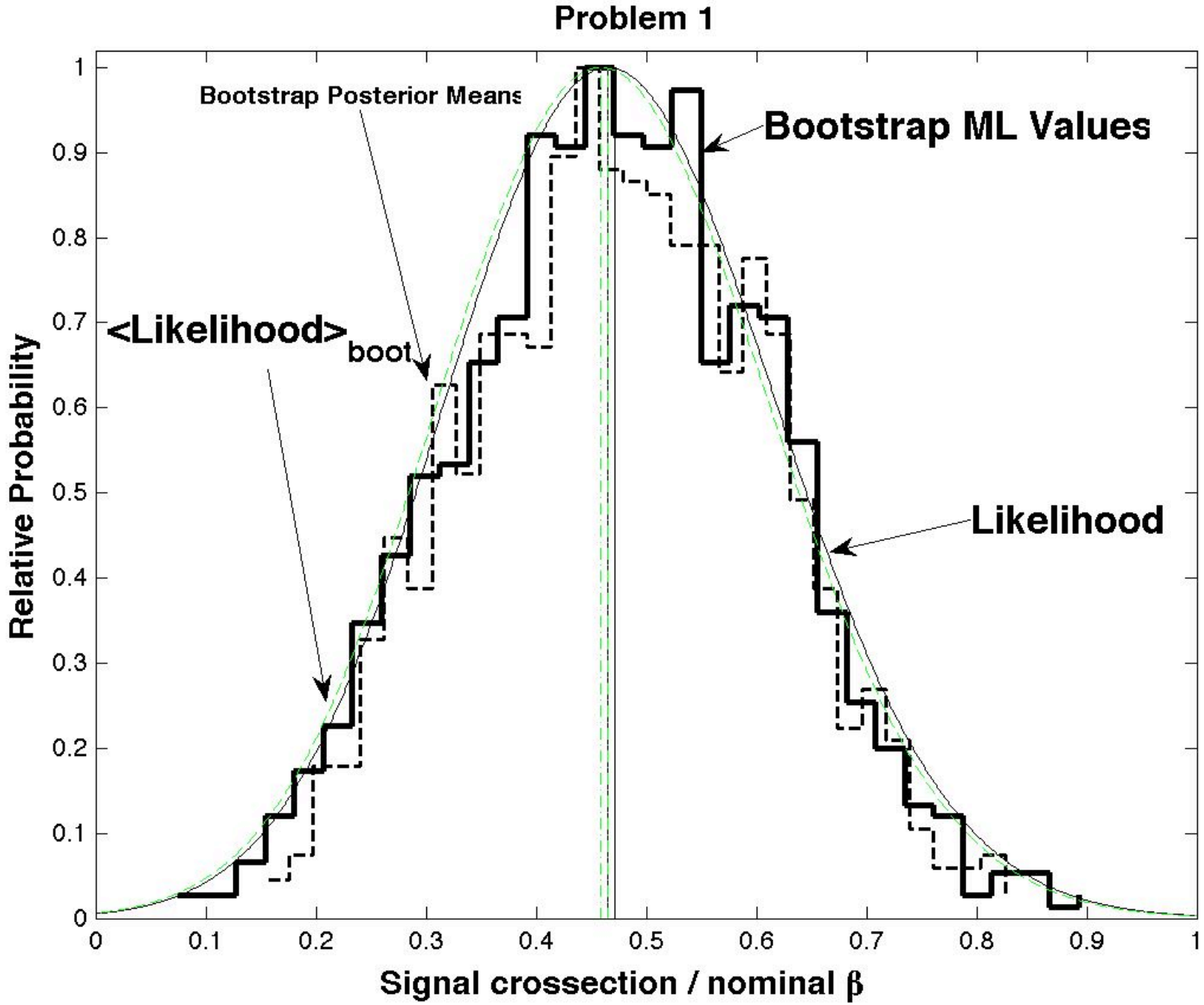

Problem 3
Optimum of $10^{40.338}$ partitions in 0.01 seconds
BB of Data Distribution
0
20
40
60
80
1
2
3
4
5
6
7
8
x 10^5
Signal Distribution
0
0.5
1
1.5
2
Observable

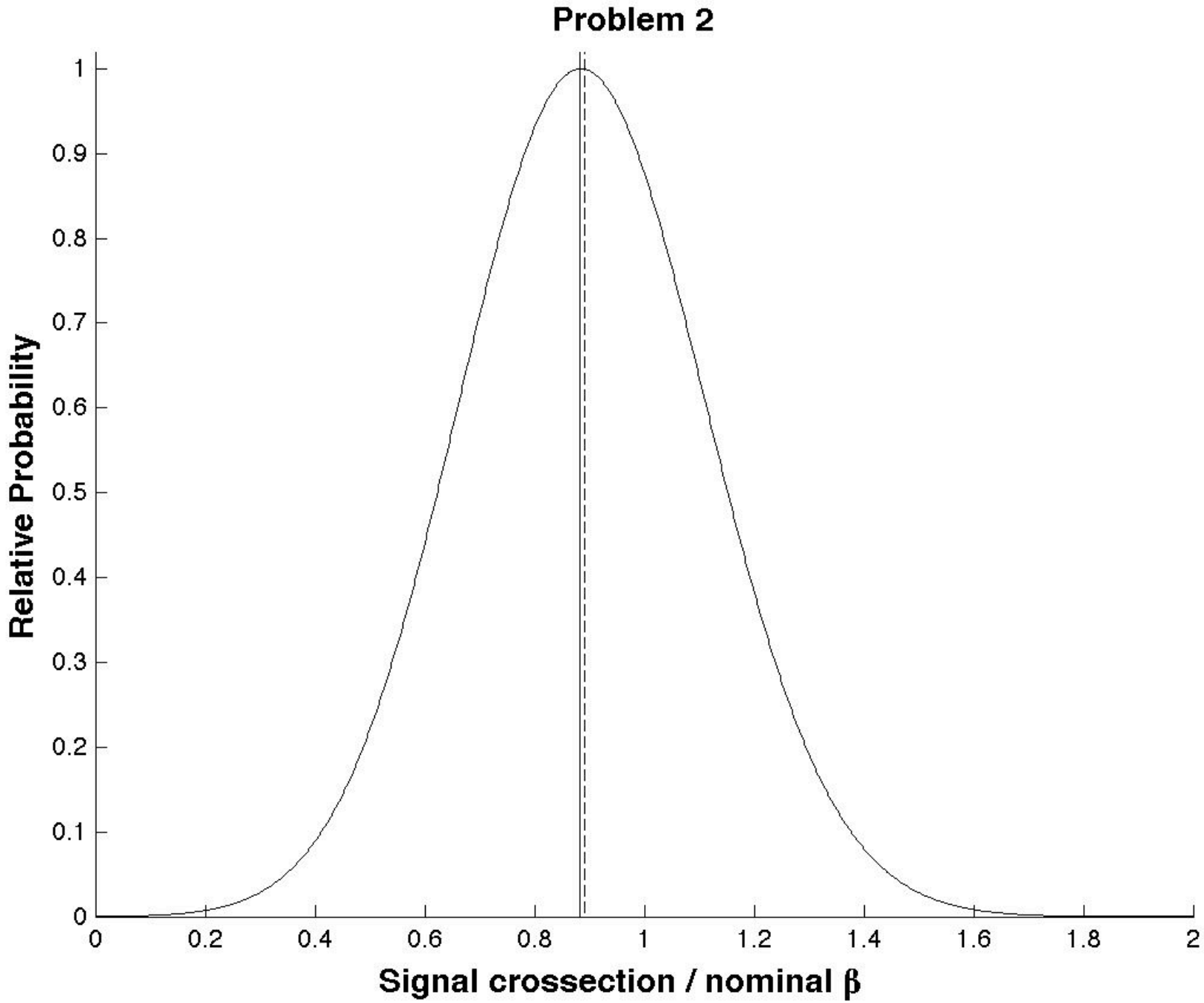
Second step:

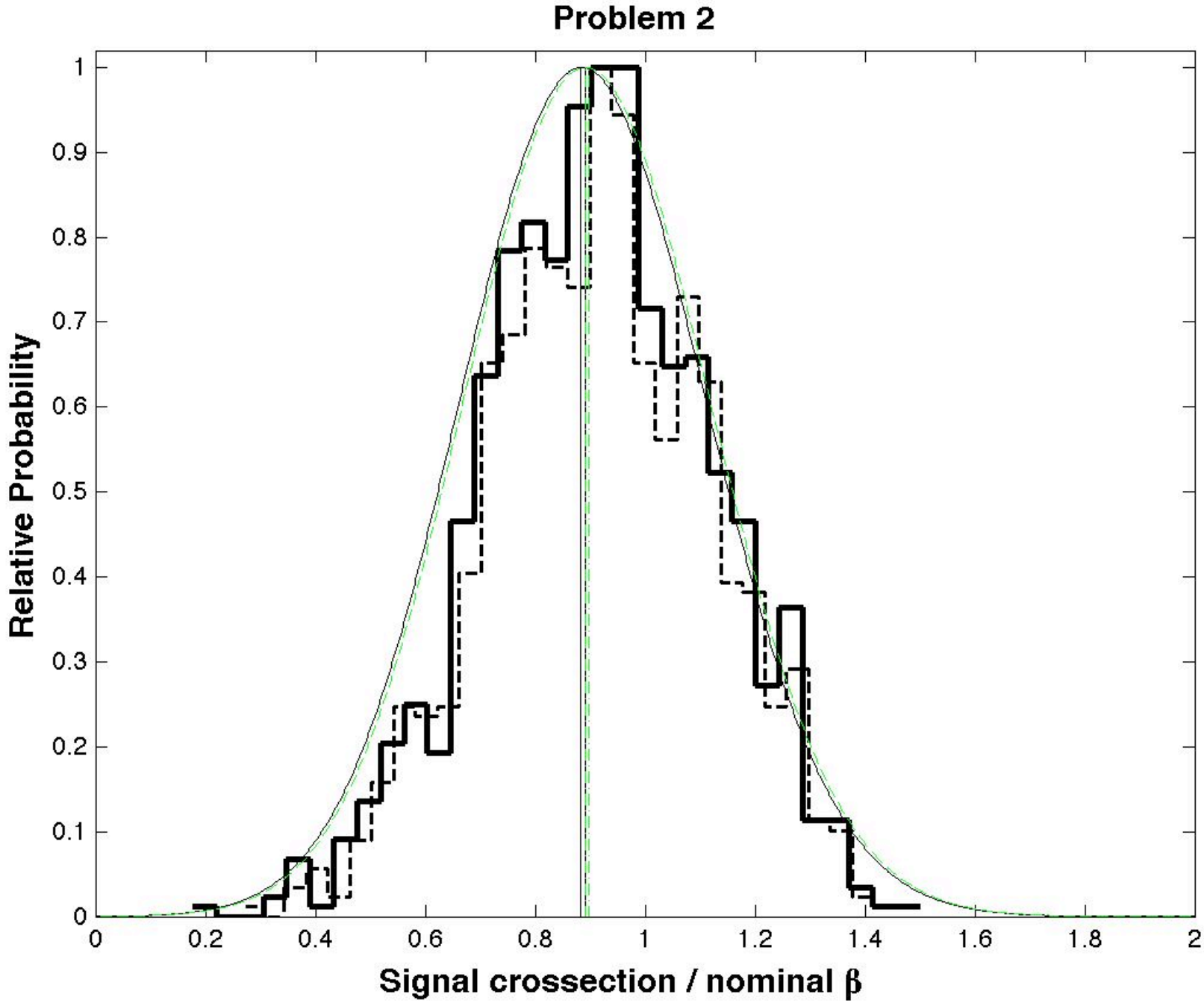
Likelihood Scan From Segmented Data

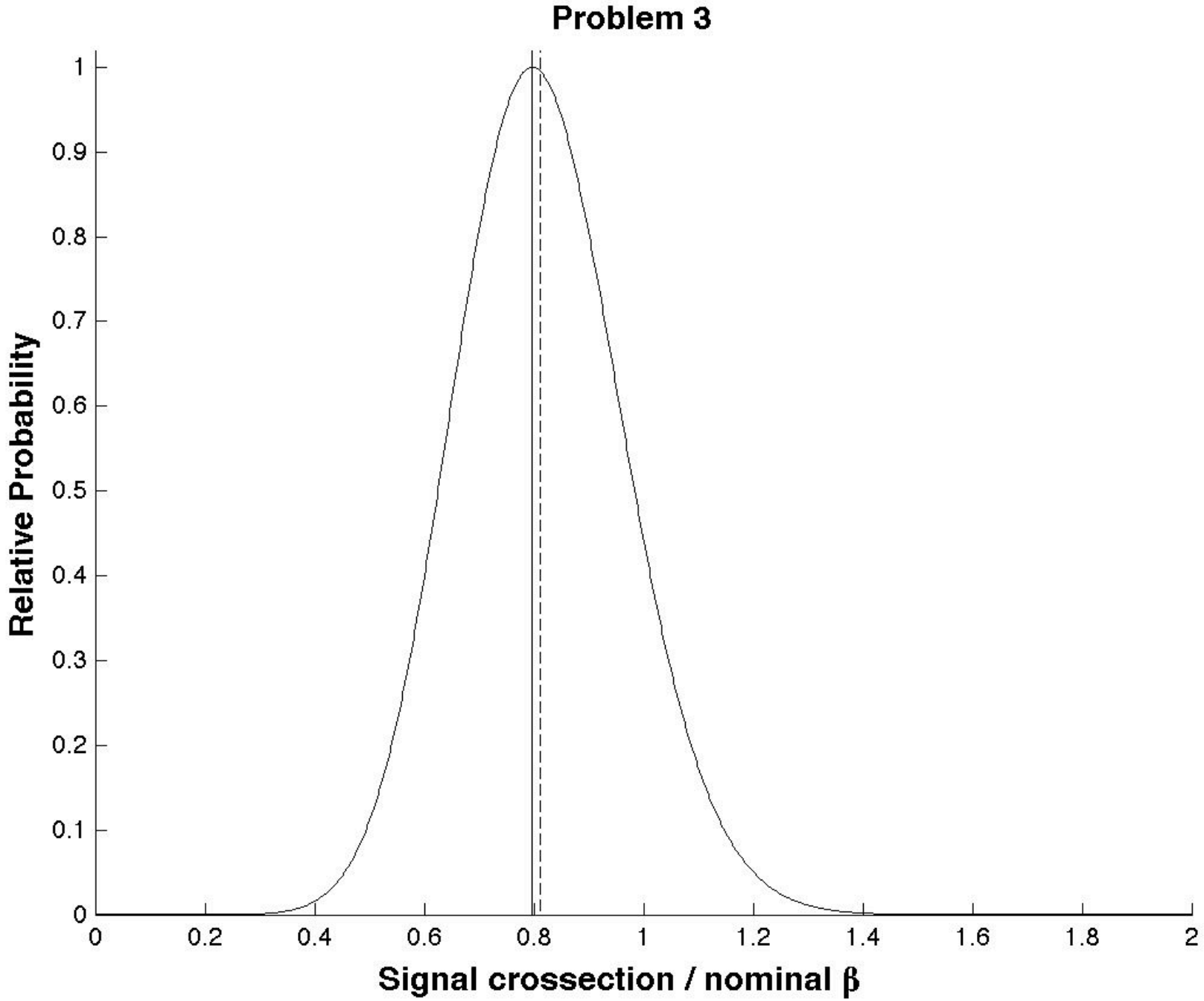
Bootstrap Marginalization

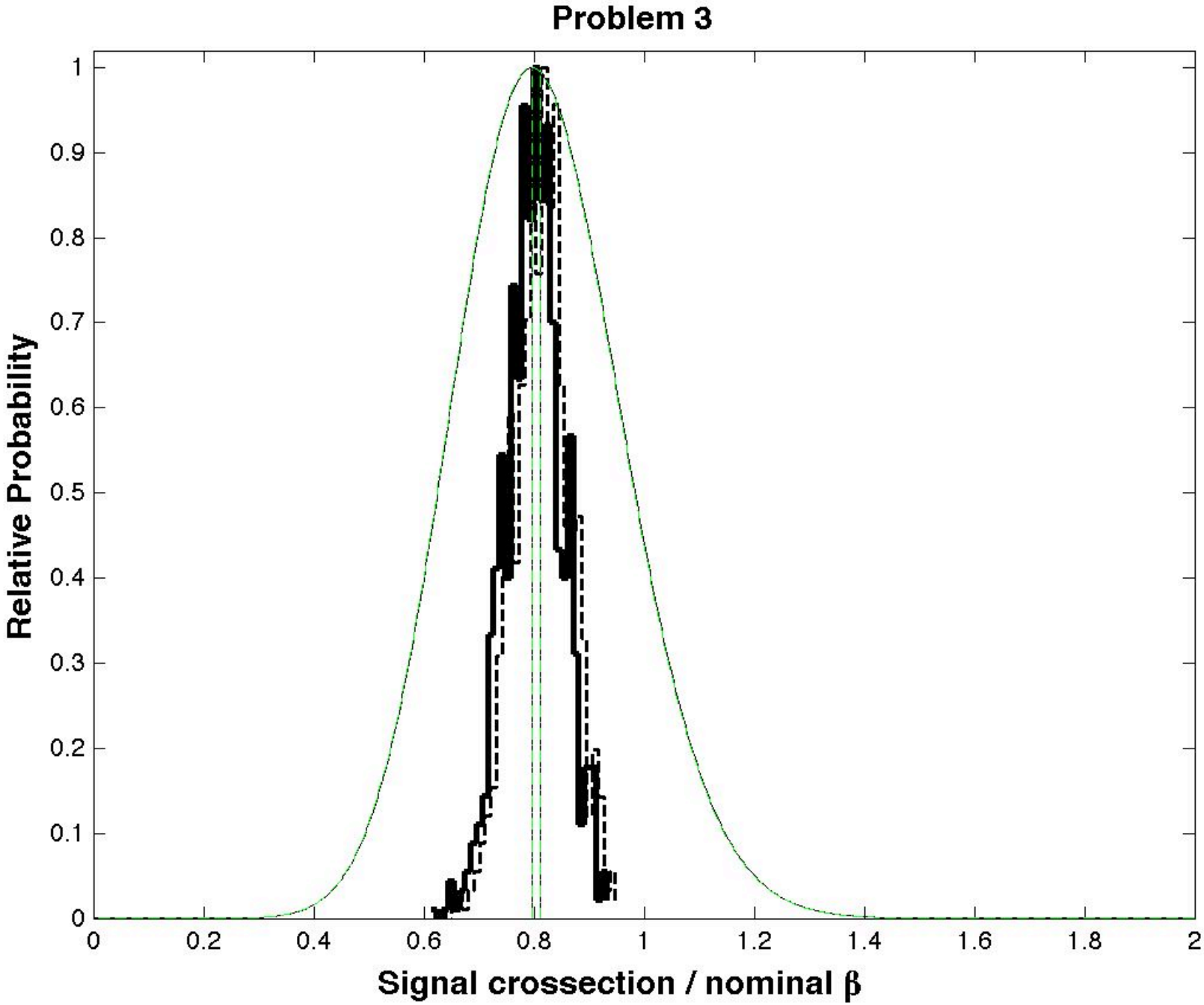

Problem 1
Maximum Likelihood
Posterior Mean
Relative Probability
Signal crossection / nominal β
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

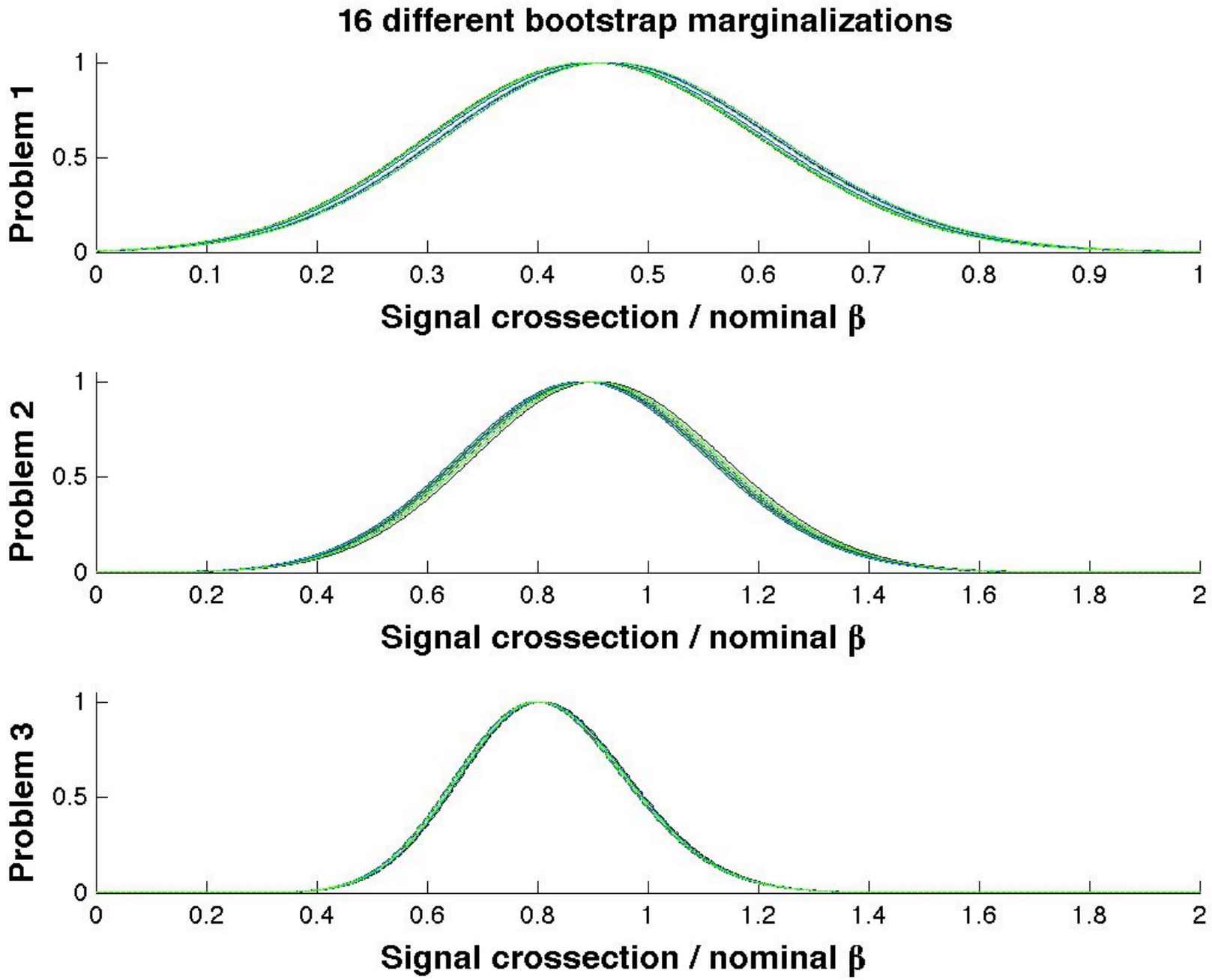

Problem 1
Bootstrap Posterior Means
Bootstrap ML Values
<Likelihood>boot
Likelihood
Relative Probability
Signal crossection / nominal β
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Problem 2
Relative Probability
Signal crossection / nominal β
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


Problem 2
Relative Probability
Signal crossection / nominal β
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


Problem 3
Relative Probability
Signal crossection / nominal β
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


Problem 3
Relative Probability
Signal crossection / nominal β
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


16 different bootstrap marginalizations
Problem 1
Problem 2
Problem 3
Signal crossection / nominal β
Signal crossection / nominal β
Signal crossection / nominal β

Possible Next Steps:

Unbinned Likelihood Scan
(using 1D Voronoi data cells)

Rescaled Data Cell Goodness of Fit