IE531 PA#4
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1. MCMC-MH

```
Tianqis-MacBook-Pro:Debug wtq$ ./MCMC_MH 10000000 x y
Multivariate Gaussian Generator using MCMC-MH
Dimension = 2

Mean Vector =
1.000000
2.000000

Covariance Matrix =
1.000000 0.500000
0.500000 1.000000

practice:       10.3566mins
theory:         0.047855seonds
Tianqis-MacBook-Pro:Debug wtq$
```

Figure 1: Sample run of the MCMC-MH based Multivariate Gaussian RV Generator; d = 2 for this illustration; no of trials = 10,000,000

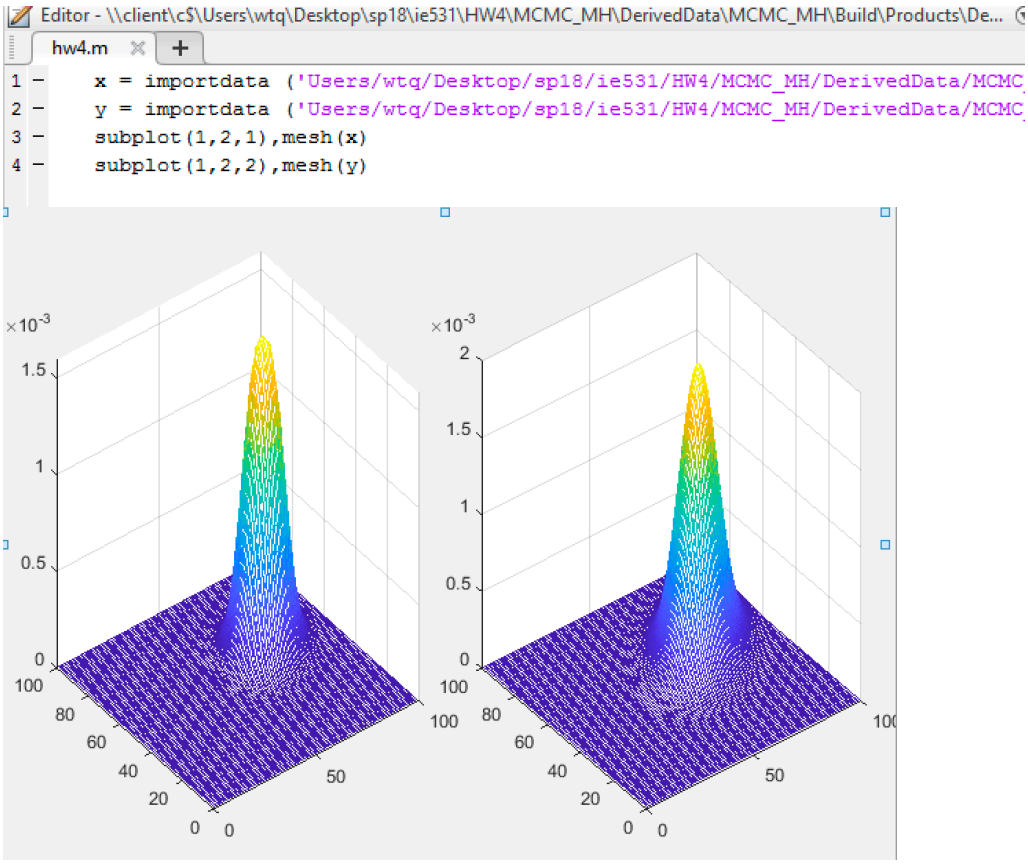

Figure 2: A comparison of the experimentally observed PDF/histogram plot (on the left) vs. the theoretical PDF (on the right) for the trial shown in figure 1 (no of trials = 10,000,000)

2. Gibbs_Sampling

```
Tianqis-MacBook-Pro:Debug wtq$ ./gibbs_sampling 10000000 x y
Multivariate Gaussian Generator using Gibbs Sampling
Dimension = 2

Mean Vector =
1.000000
2.000000

Covariance Matrix =
0.750000 0.250000
0.250000 0.500000
practice:       14.9569mins
Tianqis-MacBook-Pro:Debug wtq$
```

Figure 3: Sample run of the Gibbs Sampling based Multivariate Gaussian RV Generator; d = 2 for this illustration; no of trials = 10,000,000

```
x = importdata ('Users/wtq/Desktop/sp18/ie531/HW4/gibbs_sampling/DerivedData
y = importdata ('Users/wtq/Desktop/sp18/ie531/HW4/gibbs_sampling/DerivedData
subplot(1,2,1),mesh(x)
subplot(1,2,2),mesh(y)
```

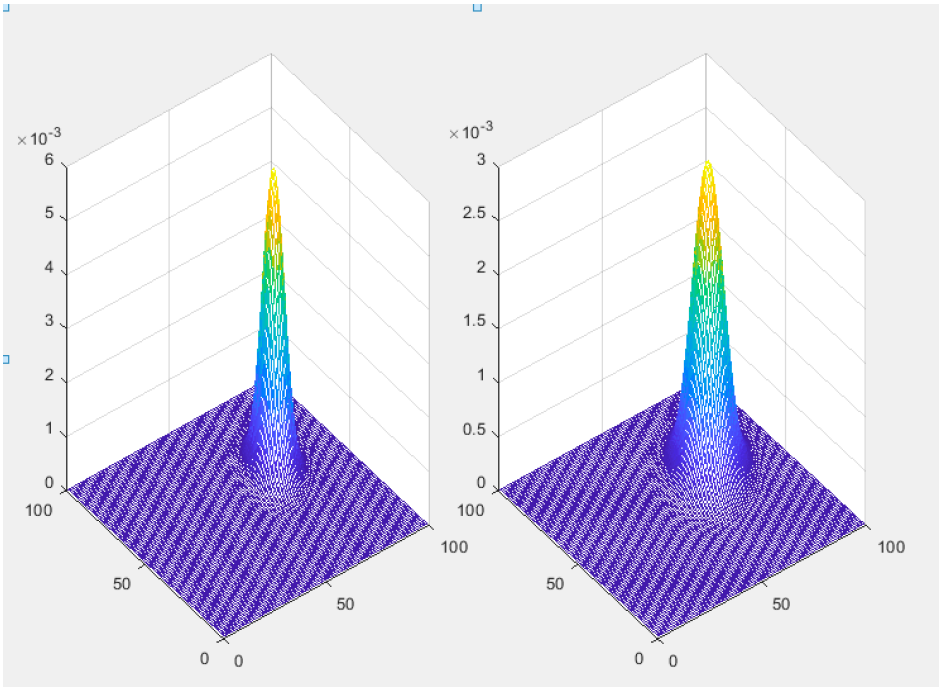

Figure 4: A comparison of the experimentally observed PDF/histogram plot (on the left) vs. the theoretical PDF (on the right) for the trial shown in figure 1 (no of trials = 10,000,000)