

## Programming Assignment 1: Gibbs Sampling

Consider a 30x30 pixel gray-scale image, where each pixel can have an intensity value in  $[0, 1]$ . We may model the image as being generated from a 900 dimensional Gaussian distribution, where each dimension represents a pixel. The mean vector of the Gaussian is 900 dimensional and is determined by the pattern of the image. Assume that the mean of the dimension corresponding to  $(i, j)$ th pixel is given by  $(i+j)/100$ . The  $(900 \times 900)$  covariance matrix is diagonal with each diagonal element being 0.1.

Use Gibbs sampling to generate image samples from this high dimensional distribution. Assume, a 900 dimensional vector with each element being 0.5, as the initial state. You may visualize the sample obtained after every 10 iterations as a 30x30 image.

Submit your program and a summary report on the parameters chosen and the simulation results.