ECE 637 Digital Image Processing Laboratory: Eigen-decompostion of Images

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1 Introduction

Nothing due for report.

2 Multivariate Gaussian Distributions and Whitening

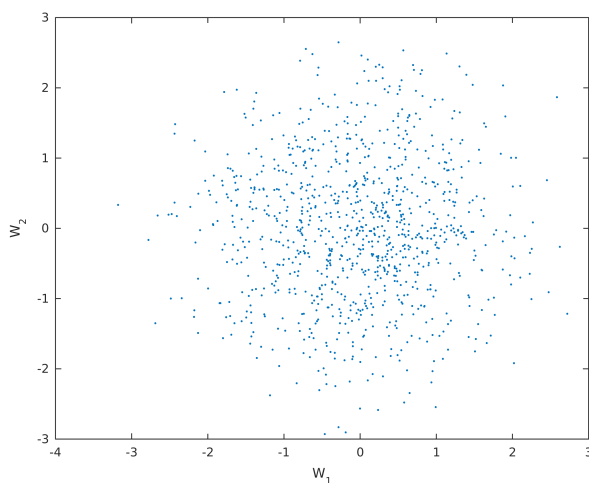### 2.1 Generating Gaussian Random Vectors
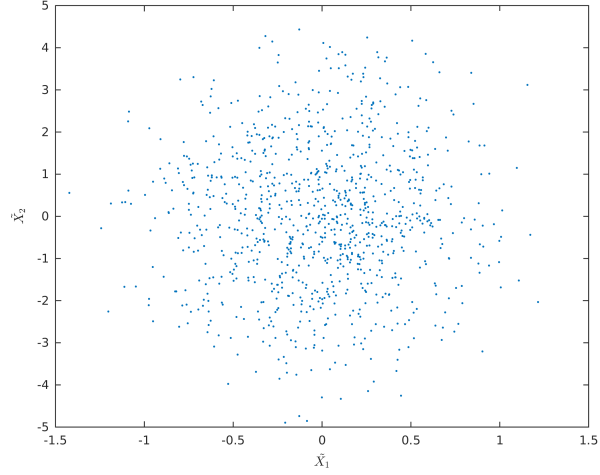

Figure 1: Scatter plot for W

Figure 2: Scatter plot for $\tilde{X}$

2.2 Covariance Estimation and Whitening

2.2.1 Theoretical Value of R_x

$$R_x = \begin{bmatrix} 2 & -1.2 \\ -1.2 & 1 \end{bmatrix}$$

2.2.2 Estimated Value of $\hat{R}_x$

$$\hat{R}_x = \begin{bmatrix} 2.0383 & -1.2230 \\ -1.2230 & 1.0133 \end{bmatrix}$$

2.2.3 Scatter Plots for $\tilde{X}_i$ and W_i

2.2.4 Estimated Covariance of Whitened Process

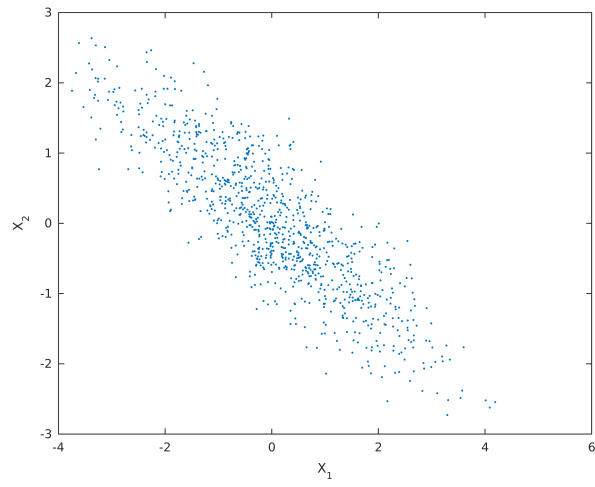$$\hat{R_W} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$
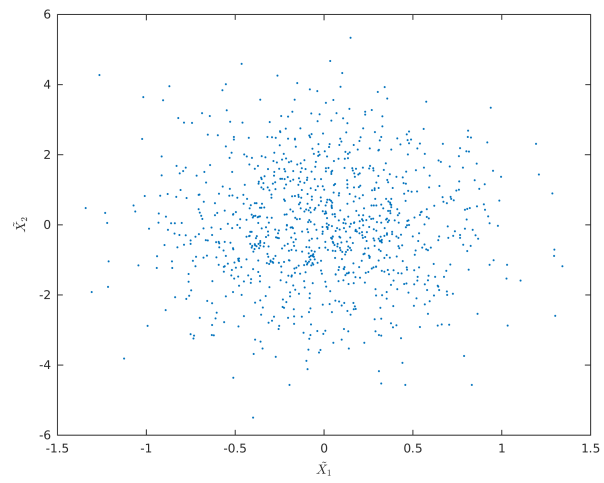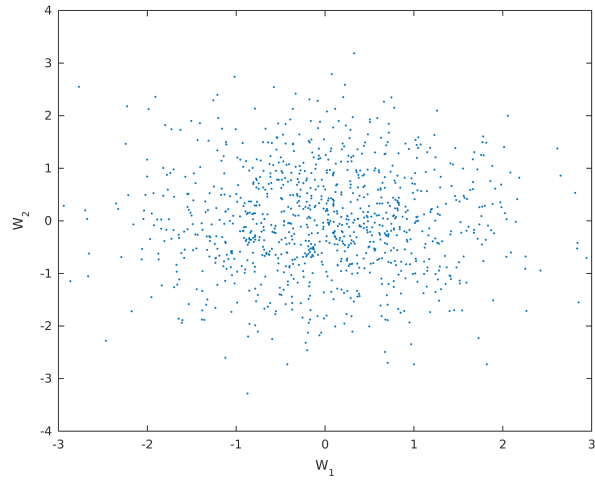
2

Figure 3: Scatter plot for X

Figure 4: Scatter plot for $\tilde{X}_i$

3

Figure 5: Scatter plot for W_i