Your title

Your name[*]

June 19, 2018

Abstract

A concise summary of the whole reading report and main findings

1 Introduction

A brief overview of the subject or research field that you are going to discuss.

2 Background

Definition 2.1. *A list of vectors* $x_1, ..., x_k \in \mathbf{C}^n$ *is* orthogonal *if* $x_i^* x_j = 0$ *for all* $i \neq j, i, j \in \{1, ..., k\}$*. If, in addition,* $x_i^* x_i = 1$ *for all* $i = 1, ..., k$ *(that is, the vectors are* normalized*), then the list is* orthonormal*.*

Example 2.2 (normalization)**.** If $y_1, ..., y_k \in \mathbf{C}^n$ are orthogonal and nonzero, the vectors $x_1, ..., x_k$ defined by $x_i = (y_i^* y_i)^{-\frac{1}{2}} y_i, i = 1, ..., k$ are orthonormal.

Theorem 2.3. *Every orthogonal list of vectors in* $\mathbf{C}^n$ *is linearly independent.*

Proof. Suppose that $\{y_1, ..., y_k\}$ is an orthogonal set. Normalize them as Example 2.2 did and obtain an orthonormal list of vectors $\{x_1, ..., x_k\}$. Assume that $0 = \alpha_1 x_1 + \cdots + \alpha_k x_k$. Then $0 = (\alpha_1 x_1 + \cdots + \alpha_k x_k)^* (\alpha_1 x_1 + \cdots + \alpha_k x_k) = \sum_{i,j} \bar{\alpha}_i \alpha_j x_i^* x_j = \sum_{i=1}^{k} |\alpha_i|^2 x_i^* x_i = \sum_{i=1}^{k} |\alpha_i|^2$ because the vectors x_i are orthonormal. Thus, all $\alpha_i = 0$ and hence $\{x_1, ..., x_k\}$ is a linearly independent set, which in turn means that $\{y_1, ..., y_k\}$ is linearly independent. □

3 Method and Evaluation

Main section of the reading report. It contains your solutions to the exercises, your methodology to address the problem, and your experimental results.

[*]Your institution

4 Conclusions

Summarize what you have written in previous sections and discuss your understandings of possible future research directions.

References

[1] Roger A. Horn, Charles R. Johnson (2012) *Matrix Analysis, Second Edition.* Cambridge University Press.