

THE TITLE HERE IN CAPS

by

My Name Here

A thesis submitted in partial fulfillment of the requirements
for graduation with Honors in Mathematics.

Whitman College
2008

Certificate of Approval

This is to certify that the accompanying thesis by (your name as it is to appear on the commencement program) has been accepted in partial fulfillment of the requirements for graduation with Honors in Mathematics.

My Thesis Advisor's Name, Ph.D.

Whitman College
May 06, 2008

Contents

1	Introduction	1
2	Preprocessing Data	2
2.1	Finding the Best Basis	3

List of Figures

- 1 This is a sample caption. The sine figure was generated in Maple. See the text if you want to incorporate it. 2

sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample
sample

2.1 Finding the Best Basis

The Basis Theorem allows us to take a multivariate data set and find a more compact representation. This means that if we have an $m \times n$ data set \mathbf{X}
sample sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample

The Best Basis Theorem. *Suppose that:*

- \mathbf{X} is an $m \times n$ mean-subtracted data matrix of m points in \mathbb{R}^n .
- \mathbf{C} is the covariance matrix of \mathbf{X}

Then the best k -element basis Φ of \mathbf{X} is found by taking the first k eigenvectors of \mathbf{C} , when arranged by eigenvalues from largest to smallest.

In his textbook, David Lay [2] gives an example of sample sample sample
sample sample sample sample sample sample sample sample sample sample

sample sample sample sample samplesample sample sample sample sample
sample sample sample sample samplesample sample sample sample sample
sample sample sample sample samplesample sample sample sample sample
sample sample sample sample samplesample sample sample sample sample
sample sample sample sample sample sample sample sample sample sample
sample sample samplesample sample sample sample sample sample sample
sample sample samplesample sample sample sample sample sample sample
sample sample samplesample sample sample sample sample sample sample
sample sample samplesample sample sample sample sample sample sample
sample sample samplesample sample sample sample sample sample sample
sample sample sample

References

- [1] The Mathworks Inc. (n.d.). Image types in the toolbox. In Image processing toolbox. Retrieved at <http://www.mathworks.com/access/helpdesk/help/toolbox/images/f14-13543.html>.
- [2] D. C. Lay, *Linear algebra and its applications*. Addison Wesley, New York, NY 2003.