Quality of reconstruction measures

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Preface

These are notes on measures of the quality of reconstruction.
This document is still in preparation. Please feel free to contact me with any suggestions, corrections or comments.

Keywords

principal component analysis, data reduction, dimensionality reduction, linear algebra, MATLAB®, Python

Contents

1 Nomenclature

$\boldsymbol{A}$	is a matrix
$\boldsymbol{A}^T$	denotes a matrix transpose
$A_{:,j}$	is a vector formed by the j^{th} column of a matrix $\boldsymbol{A}$, it is equivalent to $\boldsymbol{A}(:,j)$
$A_{i,:}$	is a vector formed by the i^{th} row of a matrix $\boldsymbol{A}$, it is equivalent to $\boldsymbol{A}(i,:)$
$a_{i,j}$	is an element from i^{th} row and j^{th} column of a matrix $\boldsymbol{A}$, it is equivalent to $\boldsymbol{A}(i,j)$

2 Coefficient of determination

3 Root mean squared error (RMSE)

$$RMSE_i = \sqrt{\overline{(\boldsymbol{X}_i - \boldsymbol{f}_i)^2}} \tag{1}$$

3.1 Normalized root mean squared error (NRMSE)

$$NRMSE_i = \sqrt{\frac{\overline{(\boldsymbol{X}_i - \boldsymbol{f}_i)^2}}{\overline{\boldsymbol{X}_i^2}}} \tag{2}$$

cov-matrix.png

Figure 1: Covariance matrix $\boldsymbol{S}$ graphical interpretation.

```
q = 1
Dataset_projected = np.dot(Dataset_proc,
np.transpose(pca.components_[:q,:]))
```

A Appendix

References