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Relative Information Loss in the PCA

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In this work we analyze principle component analysis (PCA) as a deterministic input-output system. We show that the relative information loss induced by reducing the dimensionality of the data after performing the PCA is the same as in dimensionality reduction without PCA. Finally, we analyze the case where the PCA uses the sample covariance matrix to compute the rotation. If the rotation matrix is not available at the output, we show that an infinite amount of information is lost. The relative information loss is shown to decrease with increasing sample size.

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