

Aug 10, 2013

Ref. Khan Academy: "Showing that an eigenbasis makes for good coordinate systems."

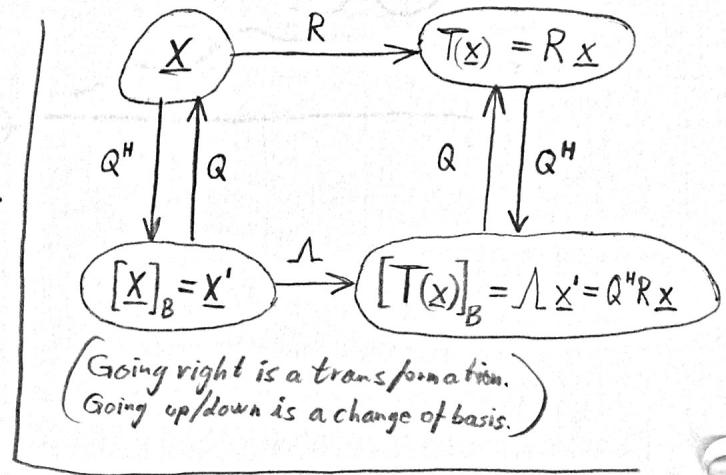
Hodgkiss

Data autocorrelation matrix R
 \underline{Q}
 Λ

Khan

Transformation matrix A
 Change of basis matrix C
 Transformation matrix w.r.t. the new basis D

- Multiply by Q^H to go from the standard basis to eigenbasis (p linearly indep. eigenvectors of R are the basis vectors).
- In this new basis, the correlation matrix is diagonal with eigenvalues of R as the elements: Λ .
- We still have all the information that was contained in the original vector, but in a different basis. If we want to revert to the original basis, we can multiply by the change of basis matrix Q .
- Khan's point is that the transformation $T(\underline{x})$ is computationally easier in the other basis since that transformation matrix is diagonal.
- Hodgkiss' point: In doing the coordinate transformation from \underline{x} to \underline{x}' , we achieve a diagonal correlation matrix $\Lambda \Rightarrow$



Elements of \underline{x}' are uncorrelated to each other!