* Symmetric Matrix properties

1. Definition :
2. Properties

* All eigenvalues of a real symmetric matrix is real

Then

* The eigenvectors are orthogonal, i.e.,

Then

* Similar transform : let

Hence

1. Exercise 6
2. Find transform matrix such that

Sol: , eigenvectors E of is

Check the diagonal transform

Hence define , the new RV is

Has the covariance is

1. The PDF of is

The PDF is

Hence the constant likelihood of a gaussian is , implies

Within the constant likelihood,

,

Hence

1. Define a new RV as

In matrix form

Hence

1. The surface area of a sphere with radius r is

Hence

* I could not find the closed form of this integral. Using matlab integral.

>>[fun=@(x)exp(-x.^2).\*x.^2](mailto:fun=@(x)exp(-x.%5e2).*x.%5e2)

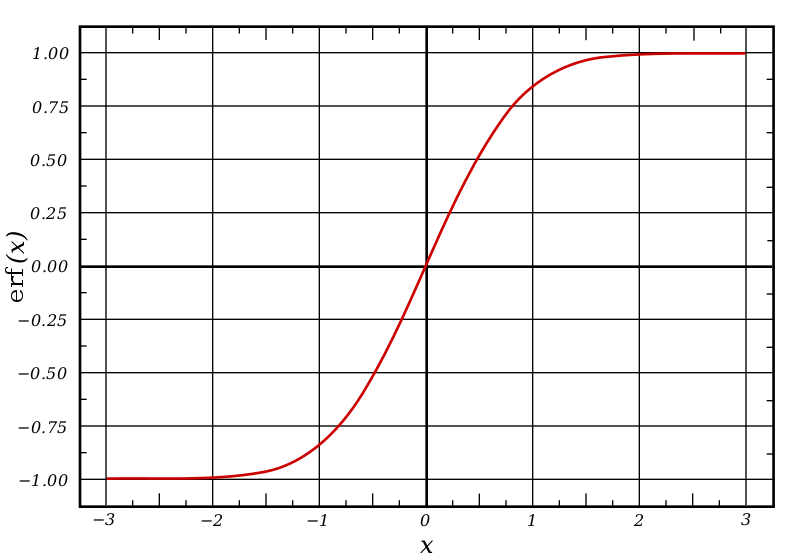
>>q =integral(fun,0,1)

>>Value=sqrt(2/pi)\*q

>> 0.1512

If c = 2, then Value = 0.3373

* Error function

<https://en.wikipedia.org/wiki/Error_function#/media/File:Error_Function.svg>