* Linear algebra

A sequence of vectors from a Vector space is said to be linearly independent, if the equation

can only be satisfied by

* Basis <https://en.wikipedia.org/wiki/Basis_(linear_algebra)>

A basis B of a vector space is a linearly independent subset of , , that spans , i.e.,

for every vector

* Orthogonal

Two vectors are orthogonal to each other if

* Application of orthogonality

1. Let a Basis B whose elements are orthogonal, i.e.,

And if a vector such that u is spanned by B as

Then the coefficient of

* The decomposition of by the orthogonal Basis
* If we extend the finite dimension to infinite dimension, it may be useful, i.e.

then

Here the space is a continuous function space( a Vector space), and one of orthogonal basis B as

And the inner product is defined as

* For this, the mathematician defines the continuous function space as a “Hilbert Space”
* In case of Probability space,