**Linear Algebra**

Contents

[1. Composing Transformation Matrix 2](#_Toc123711061)

[1.2. Orthogonal Projections 2](#_Toc123711062)

[1.2.2. Steps to find 2](#_Toc123711063)

[1.2.3. General Formulae: 2](#_Toc123711064)

[1.3. Reflections 4](#_Toc123711065)

[1.3.1. How to find? 4](#_Toc123711066)

[1.3.2. General Formulae: 4](#_Toc123711067)

[1.4. Parallel Projections 4](#_Toc123711068)

[1.5. Shear 4](#_Toc123711069)

[2. 3D space 4](#_Toc123711070)

# Composing Transformation Matrix

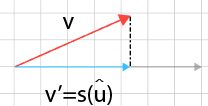
Steps in composing the transformation matrix

* + - * Work with 1 vector first
      * Compose a formulae to solve the problem
      * Substitute the vector with algebra
      * Next substitute the axis vector and solve
      * Always use the unit vectors
      * Then compute each vector e respectively to get each column for the matrix
      * 2D and 3D uses the same method

## Orthogonal Projections

Projecting a vector onto an arbitrary vector

### Finding the result vector and



* + - * Normalize the arbitrary vector to normalize vector
      * Dot product to a scalar, s
      * Multiply scalar s with normalized vector

### Form a General Formulae:

Projection of Vector V onto Vector U:

Rewrite:

### Compose the Matrix:

Compose for all 3 axes:

Compose the matrix:

Expand and solve:

## Reflections

Reflect a vector over an arbitrary vector

### How to find?

### General Formulae:

## Parallel Projections

## Shear

# 3D space