# COMPUTER GRAPHICS WITH VECTORS

We typically do computer graphics using vectors. Vector objects may be graphically represented as arrows, with their tails at the origin, and a tip at some point in space.


Vectors may be added, subtracted, scaled and rotated.

Python allows us to redefine the behavior of the +, - and * symbols so that we may write expressions such as v1 + v2 or v1 – v2, or 8 * v1, when working with vectors. This feature is called "operator overloading."
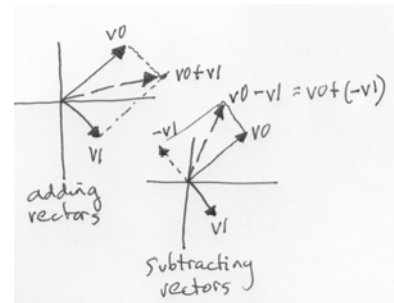
Suppose you have an action figure defined by many vertices and edges. Every vertex would correspond to a vector.

The figure would move if a displacement vector were added to every vertex. The tip of the nose, toes, eyebrows, would all move along some arrow, to a new place. Sliding a figure some fixed distance is called "translation".
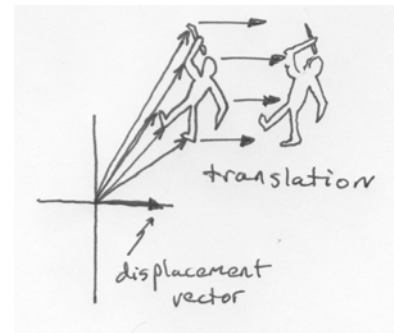
To rotate a figure, we typically translate it to the origin, rotate it, and translate it back to where it came from. This is because rotation is about an axis, and if the figure is far from the axis, it orbits rather than rotating in place.