Computer Graphics Homework 3

Due: Thursday November 5, 2015

1. Write out (as the product of exact matrices) the transformation matrix that results from a rotation of 45 degrees about the Y axis, followed by a translation by the vector [1,2,2,0]', followed by a rotation of 30 degrees around the Z-axis.
2. We defined an instance transformation as the product of a translation, a rotation, and a scaling. Can we accomplish the same effect by applying these three types of transformations in a different order?
3. Show that the sum

$$P=α\_{1}P\_{1}+ α\_{2}P\_{2}+…+α\_{n}P\_{n}$$

Is defined if and only if

$$α\_{1}+ α\_{2}+…+α\_{n}=1$$

Hint: Start with the first two terms and write them as

$$P=α\_{1}P\_{1}+ α\_{2}P\_{2}+…= α\_{1}P\_{1}+ (α\_{2}+α\_{1}-α\_{1}) P\_{2}+…= α\_{1}(P\_{1}-P\_{2})+(α\_{1}+α\_{2})P\_{2}+…$$

and proceed inductively.