Quick Start Guide

Install\* the package using the instructions in the Installation Guide. Then, to use the package, open a notebook and start your session with the statement Needs ["GeomAlg2017Jan`"] or, equivalently, <<"GeomAlg2017Jan`". If you open a 2nd notebook later, it also must begin with the “Needs” statement. You can use the palette to quickly enter the needs statement. If Mathematica 10 or later gives you “shadow” errors, you may wish to read the cautions in the main documentation.

The palette has been designed as an instrumental part of this package and should be installed before proceeding. Simply open the notebook Geom Alg Palette.nb, run it (i.e., put the cursor anywhere within the code and press ENTER) to display the palette, move it to your preferred default location, and select Install Palette ... from the Palette menu. Select Geometric Algebra (GA) Palette from the Source drop-down menu, give the palette any name, for example Geometric Algebra, and click OK. If you later wish to change the default palette location, simply move it. If you find any items too small to read, click on the magnification box at the bottom.

Step 1 is to use the palette to select your GA (Grassmann, Clifford, etc.). It also allows you to change your GA on-the-fly without having to quit either the kernel or Mathematica. After that you can use the palette to quickly enter vectors, bivectors, blades, and general multivectors (which I often call clifs, for Clifford, because clif is shorter than multivector and helps keep the palette narrower). The palette not only shows you all the available commands, it illustrates many of them and has tooltips for all of them. Thus, it is your on-screen documentation center as well as your user interface. Click on the triangles to expand/contract sections.

The file "Examples" can be examined to see how most of the operations work. I recommend you first run it using the default initialization of

Clifford Algebra

Mathematicians

0 Time dimensions

Especially, the airplane rotation example is meant for using a Clifford algebra in pure space.

This package was designed primarily for Clifford algebras but basic Grassmann algebra operations such as dot and wedge products follow the same rules except for what happens when basis elements are squared. Thus, by using only 1-line of code to control the results of ei2 for every i, it was expedient to enable Grassmann operations. However, many of the built-in operations may not be relevant for Grassmann algebras.

\* This package was developed and tested only on a Mac. Windows users may need to install a font that recognizes the binary operator symbols SmallCircle, Wedge, CenterDot, Square Superset, and SquareSubset, shown in the Notebook version of this QuickStart guide. If the symbols are visible, then no font change is required.