

Length-1 Vector Multiplication Error

Sometimes, we want to multiply data arrays (a,b,c..) by another array of coefficients (A B C..), and this produces a nice orderly matrix of columnar data.

$$\begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} \cdot [A \ B \ C] \rightarrow \begin{bmatrix} A \cdot a & B \cdot a & C \cdot a \\ A \cdot b & B \cdot b & C \cdot b \\ A \cdot c & B \cdot c & C \cdot c \\ A \cdot d & B \cdot d & C \cdot d \end{bmatrix}$$

$$\begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} \cdot [A \ B] \rightarrow \begin{bmatrix} A \cdot a & B \cdot a \\ A \cdot b & B \cdot b \\ A \cdot c & B \cdot c \\ A \cdot d & B \cdot d \end{bmatrix}$$

This follows the standard rules of matrix multiplication until we arrive at the Length-1 vector, which throws an error. (These array dimensions do not match.)

$$\begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} \cdot [A] \rightarrow ?$$

Well, this is patently false, and we shouldn't have to make it into a single element to carry out the multiplication, especially when passing arrays as arguments to functions and come across a special instance of a length-1 vector.

$$\begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} \cdot A \rightarrow \begin{bmatrix} A \cdot a \\ A \cdot b \\ A \cdot c \\ A \cdot d \end{bmatrix}$$

Obviously there are many ways to catch and handle this, but it shouldn't be necessary.