Subject: Accuracy problem
Posted by Juan Arrieta on Sat, 11 Mar 2006 03:38:46 GMT
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Hi!

I am preparing a simple code to transform between cartesian vectors and Keplerian elements (semimajor axis, inclination, eccentricity, and so forth). This is a simple problem in astrodynamics.

At some point in my code, I need to obtain unit vectors. For instance, a line of the code is:

U0 = ACOS((TRANSPOSE(NDVCT) # R) / (NORM(NDVCT) * NORM(R)))

(the argument of Latitude, U0. An angle)

This is nothing more than dot(NDVCT , R) / (|NDVCT| * |R|). This is supposed to be less than or equal to one (absolute value). What happens, is that the result is slightly more than one (as it appears) and the ACOS function throws an exception (ACOS of a number greater than one is an exception).

For instance, consider this output:

```
print,NDVCT
0.91855860      0.53033008      -0.0000000
print,R
1.2990381      0.75000000       0.0000000
arg = (TRANSPOSE(NDVCT) # R) / ( NORM(NDVCT) * NORM(R) )
print,arg
1.0000000
print,arg gt 1
1
help, arg
ARG             DOUBLE    = Array[1]
U0 = ACOS( TRANSPOSE(NDVCT) # R / ( NORM(NDVCT) * NORM(R) ))
% Program caused arithmetic error: Floating illegal operand
print,U0
NaN
```

I am using a Sun JAVA Workstation, with AMD64 processors (opteron 250).
Any comments as for what would the problem be? This seems like a roundoff error somewhere in the program, but I am not doing anything "fancy" here.

Thank you for your time and help.

Juan