

## Earth Gyroscope

### General solution for the two most important gyroscopic precession cycle

x axis is left to right of the screen, y axis is low to high the screen, z axis is perpendicular to the screen, I is gyroscope inertia, w is angular speed, M is the torque, then:

$$I(0''x) = M - iw(0'z) , \quad (\text{equation 1}),$$

$$I(0''z) = Iw(0'x) , \quad (\text{equation 2}),$$

$$(0'z) = w(0x) , \quad (\text{equation 3}),$$

$$(0''x) = M/I - (w^2)(0x) ,$$

$$(0''x) + (w^2)(0x) = M/I , \quad (\text{equation 4}),$$

The resolution of this equation is:

$$0x = e^{-j\omega t} + M/[I(w^2)] , \quad (\text{equation 5}),$$

$$0'x = (-j\omega)e^{-j\omega t} , \quad (\text{equation 6}),$$

As  $0'z = w(0x)$  then from equation 5 :

$$0'z = (w)e^{-j\omega t} + M/(Iw) , \quad (\text{equation 7}),$$

For  $t = T/2$ , then:

$$(0'z) \text{ maxima} = (w)e^{-.5j\omega T} + M/(Iw) = 2[(360 \text{ degrees})/P] , \quad (\text{for } t = T/2), \quad (\text{equation 8}),$$

because  $0'z$  maxima is twice the mean value of  $0'z$ ,

As  $M/(Iw) = (360 \text{ degrees})/P$  , then from equation 8:

$$e^{-.5j\omega T} = (360 \text{ degrees})/(wP) = M/[I(w^2)] , \quad (\text{equation 9}),$$

$$(w)e^{-.5j\omega T} = (360 \text{ degrees})/P = M/(Iw) , \quad (\text{equation 10}),$$

$$(w)e^{-.5j\omega T} = M/(Iw) , \quad (\text{equation 11}),$$

From equation 8 and equation 11 :

$$(0'z) \text{ maxima} = 2[(w)e^{-.5j\omega T}] , \quad (\text{equation 12}),$$

For constant acceleration:

$$(0'z) \text{ mean value} = (1/2)[(0'z) \text{ maxima}] , \quad (\text{equation 13}),$$

From equation 12 and equation 13:

$$(0'z) \text{ mean value} = (1/2)[2w e^{(-.5jwT)}] , \quad (\text{equation 14}),$$

For relation between T and P we are only to do the ratio of the mean value for (0'z)(P) and (0'x)(T) and for:

$$(0'z) \text{ mean value} = (1/2)[2(w) e^{(-.5jwT)}] , \quad (\text{equation 14}),$$

From equation 6, for  $t = T/2$  :

$$(0'x) \text{ maxima} = [(-jw) e^{(-.5jwT)}] , \quad (\text{equation 15}),$$

$$(0'x) \text{ mean value} = (1/2)[(0'x) \text{ maxima}] , \quad (\text{equation 16}),$$

From equation 16 and equation 15:

$$(0'x) \text{ mean value} = (1/2)[(-jw) e^{(-.5jwT)}] , \quad (\text{equation 17}),$$

$$[(0'z) \text{ mean value}](P/2) = (180 \text{ degrees}), \quad (\text{equation 18}),$$

$$(1/2)[2(w) e^{(-.5jwT)}](P/2) = (180 \text{ degrees}), \quad (\text{equation 19}),$$

$$[(0'x) \text{ mean value}](T/2) = (\text{variability angle}),$$

$$(1/2)[(-jw) e^{(-.5jwT)}](T/2) = (\text{variability angle}), \quad (\text{equation 20})$$

(equation 19)/(equation 20):

$$[(2P)/(-jT)] = (180 \text{ degrees})/(\text{variability angle}), \quad (\text{equation 21}),$$

For absolute value:

$$2[(\text{variability angle})/(180 \text{ degrees})]P = T , \quad (\text{equation 22}),$$

This is a general resolution and for the earth this equation is also good even if there is 2 precession cycle T and 2 precession cycle P ;

for earth gyroscope stir up by Moon, try variability angle = 2.4 degrees, and equinox precession  $P = 26\,000$  years, then:

$$2[(2.4 \text{ degrees})/(180 \text{ degrees})](26\,000 \text{ years}) = T,$$

$$693.33 \text{ years} = T,$$

I give here the good value for Earth gyroscope:

Change  $Iw(0'z)$  from equation 1 by:

$$[Iw(0'z)]\cos(76.5) = (.233)Iw(0'z) \text{ and this is about constant, also change } Iw(0'x) \text{ from equation 2 by:}$$

(.233)Iw(0'x) ,then the resolution of equation 1 and 2 is:

$$0x = e^{(-.233j\omega t)} + M/[I(.233\omega)^2] , \quad (\text{equation 23}),$$

$$[(0'z1) - (0'z2)](P/2) = (180 \text{ degrees}),$$

$$(180 \text{ degrees}) = (.233\omega)[e^{(-.233j\omega t1)} - e^{(-.233j\omega t2)} + A + B](P/2) , \quad (\text{equation 24}),$$

$$A = M1/[I(.233\omega)^2] , \quad B = M2/[I(.233\omega)^2],$$

$$[(0'x1) - (0'x2)](T/2) = (\text{variability angle}) ,$$

$$(\text{variability angle}) = (-.233j\omega)[e^{(-.233j\omega t1)} - e^{(-.233j\omega t2)}](T/2) , \quad (\text{equation 25}),$$

$$(\text{equation 24})/(\text{equation 25}) : \quad [\text{from } t1 = (T1)/2 \text{ and } t2 = (T2)/2],$$

$$(180 \text{ degees})/(\text{variability angle}) = -2P/(jT) ,$$

For absolute value:

$$T = [2(\text{variability angle})/(180 \text{ degrees})]P , \quad (\text{equation 26}),$$

It is the same equation that equation 22 and from variability angle = 2.4 degrees and equinox precession  $P = 26\,000$  years,  $T = 693.33$  years.

I have found 2 curve temperature for the last 2000 years,  
please choice curve light green and red and notice that there is 2 minima between  
about 900 and 1600, the sediments for this two curve have been took in North hemisphere, here the  
web page:

[http://www.wikipedia.org/wiki/File:2000\\_Year\\_Temperature\\_Comparison.png](http://www.wikipedia.org/wiki/File:2000_Year_Temperature_Comparison.png)