This file calculate the speeds and torques of all members of a planetary gear set as well as the F, S &T loads for the planet gear. The required inputs are the "status" of each component, for column 5 of the input matrix "size" - ring, sun, carrier are either:

fixed = 1,
input = 2,
free = 3,

The units convention for the "size" matrix is (for all of column 3 & column 7-row 2):
1 = ft   2 = m
The units convention for input torque is:
1 = lbf * ft   2 = N*m
The units convention for mass is:
1 = lb   2 = gm

Assign speed and torque inputs: $\omega_{in} := 1\ rpm$ $\tau_{in} := 2500000\ N \cdot m$

"Size" Matrix Entry Guide						
# Teeth	Gear PDs	Unit	Tooth Angles	Elements' Status	Other Info	Planet Mass
Ring # Teeth	Ring PD	Unit Code	Gear tooth Pressure Angle	Ring Gear Status	0	Planet Gear Mass
Planet # Teeth	Planet PD	Unit Code	Gear Tooth Helix Angle	0	Sun Gear Hand 1=left 2=right	Planet Gear mass units code
Sun # Teeth	Sun PD	Unit Code	0	Sun Gear Status	# Planet Gears	0
0	Carrier PD	Unit Code	0	Carrier Status	0	0

$$size := \begin{bmatrix} 60 & 1.2 & 2 & 20 & 1 & 0 & 1 \cdot 10^{-3} \\ 15 & 0.6 & 2 & 0 & 0 & 1 & 2 \\ 30 & 0.3 & 2 & 0 & 3 & 4 & 0 \\ 0 & 0.8 & 2 & 0 & 2 & 0 & 0 \end{bmatrix}$$

Ring
Planet
Sun
Carrier

$$\begin{array}{cccc} & \text{speed} & \text{torque} & \text{unit} \\ input := & & \begin{bmatrix} 0 & 0 & 2 \\ 0 & 0 & 2 \\ \dfrac{\omega_{in}}{rpm} & \dfrac{\tau_{in}}{N \cdot m} & 2 \end{bmatrix} & \end{array}$$

RING
SUN
CARRIER

Output quantities of the planetary are found in "out1", below as follows:

Row 1 - all ring gear outputs
Row 2 - all planet gear outputs
Row 3 - all sun gear outputs
Row 4 - all carrier outputs

Column 1 - rotational speeds [rpm]
Column 2 - torque [see unit convention from input matrix above]
Column 3 - unit [see convention documented above]
Column 4 - F, S, T and Cb (centrifugal load on the planet bearing/shaft) [unit convention]
Column 5 - planet bearing radial and thrust load [unit convention]

$$\begin{array}{ccccc} \omega & t & \text{unit} & F,S,T,FCb & Fbrg,Tbrg \end{array}$$

$$out1 = \begin{bmatrix} 0.000 & 1.667 \cdot 10^{6} & 2.000 & 1.389 \cdot 10^{6} & 1.563 \cdot 10^{6} \\ -4.000 & 0.000 & 0.000 & 505514.214 & 0.000 \\ 3.000 & 833333.333 & 2.000 & 0.000 & 0.000 \\ 1.000 & 2.500 \cdot 10^{6} & 2.000 & 4.386 \cdot 10^{-9} & 0.000 \end{bmatrix}$$

Ring
Planet
Sun
Carrier