04/13/18 02:07:53 /home/jorrit/git/StarandPlanetform/Orbit_calculations/Kriekscode/theforacc2.py

```python
from __future__ import division
import initialOrbitals as ic
import numpy as np
import math

# Function used to calculate the force
def calcForce(R, mass,mass2):
    # Here the force is calculated
    F = ((ic.G*(mass * mass2))/(R**2))
    return F

# Function used to calculate the acceleration
def calcAcc(x,y,F,mass,theta):

    ax = (math.sin(theta)*F)/mass
    ay = (math.cos(theta)*F)/mass

    # flips the acceleration if the object is on the other side of the ellipse
    if x < 0:
        ax = -ax
    if y < 0:
        ay = -ay

    return ax,ay


# Function used to calculate theta
def calcTheta(x,y):
    # sets theta on 90 at the starting position
    if y == 0:
        theta = math.pi/2
    else:
        theta = math.atan(np.sqrt(x**2)/(np.sqrt(y**2)))

    return theta

# Function used to calculate the distance between the planet and the sun
def calcDist(x,y):

    R = np.sqrt(x**2 + y**2)
    return R

def calcKepp(R):
    vkep = np.sqrt(ic.G*(ic.Ms)/R)

    return vkep

def Dragacc(v, vgas):
    return -1.*(v-vgas)/(ic.tstop)

def calcDrag(x, y, orbital, vx, vy, dt):
    """Calculate drag Earth experiences"""

    # calculate distance to center of mass and theta
    rx,ry = orbital.RKCM(dt)
    xcm = rx-x
    ycm = ry-y
    R = calcDist(xcm,ycm)
    theta = calcTheta(x,y)
    # calculate gas velocity in the x and y direction
    vkep = calcKepp(R)
    vhw = ic.gashead * vkep
    vgas = vkep - vhw
    vgasx = math.cos(theta)*vgas
    vgasy = math.sin(theta)*vgas

    # Set the velocity of gas in the proper direction
    ex = 1
    ey = 1
    if x < 0:
        ey = -ey
        if y > 0:
            ex = -ex

    if x > 0:
```

```
76          if y > 0:
77              ex = -ex
78
79      vgasx = (vgasx)*ex
80      vgasy = (vgasy)*ey
81
82      # Calculate acceleration as a result of the dragforce on the planet
83      ax = Dragacc(vx,vgasx)
84      ay = Dragacc(vy,vgasy)
85
86      return ax,ay
87
88
89  def calcDragHW(x, y, orbital, vx, vy, dt, hw):
90      """Calculate drag Earth experiences"""
91
92      # calculate distance to center of mass and theta
93      rx,ry = orbital.RKCM(dt)
94      xcm = rx-x
95      ycm = ry-y
96      R = calcDist(xcm,ycm)
97      theta = calcTheta(x,y)
98      # calculate gas velocity in the x and y direction
99      vkep = calcKepp(R)
100     vhw = hw * vkep
101     vgas = vkep - vhw
102     vgasx = math.cos(theta)*vgas
103     vgasy = math.sin(theta)*vgas
104
105     # Set the velocity of gas in the proper direction
106     ex = 1
107     ey = 1
108     if x < 0:
109         ey = -ey
110         if y > 0:
111             ex = -ex
112
113     if x > 0:
114         if y > 0:
115             ex = -ex
116
117     vgasx = (vgasx)*ex
118     vgasy = (vgasy)*ey
119
120     # Calculate acceleration as a result of the dragforce on the planet
121     ax = Dragacc(vx,vgasx)
122     ay = Dragacc(vy,vgasy)
123
124     return ax,ay
```