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clear all; clc;
K=3; % revisit period
N=45; % no of orbits during between two revisits
T=(K/N)*24*3600; % initial guess for time period
n0=2*pi/T; % initial guess for mean motion
we = 1.99106e-7;
mu=398600;
a=((T/2/pi)^2*mu)^(1/3); % initial guess for semi major axis
R=6378.145;
J2=0.00108263;
i=acos(-2/3*(a/R)^2*we/(n0*J2)); % initial guess for inclination

tol=1;
counter=0;
% while tol>0.1
    counter=counter+1
    for counter=1:1
        odot=0.75*n0*J2*(R/a)^2*(5*cos(i)^2-1); % J2 affects argument of perigee
        deln=-0.75*n0*J2*(R/a)^2*(3*sin(i)^2-2); % J2 affects the mean motion
        n=deln+n0+odot; % new mean motion
        T=(2*pi/n); % new time period
        a_new=((T/2/pi)^2*mu)^(1/3); % new semi major axis
        i=acos(-2/3*(a/R)^2*we/(n0*J2)); % new inclination
        tol=abs(a_new-a);
        a=a_new;
        n0=n;
    end
    h=a-R

ground_track(h,i) % plot ground track taking altitude and inclination

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counter =

1

h =

572.7831

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Angular momentum = 52636.9 km<sup>2</sup>/s  
 Eccentricity = 0  
 Semimajor axis = 6950.93 km  
 Perigee radius = 6950.93 km  
 Apogee radius = 6950.93 km  
 Period = 1.60204 hours  
 Inclination = 97.6583 deg  
 Initial true anomaly = 100 deg  
 Time since perigee = 0.445011 hours  
 Initial RA = 270 deg  
 RA\_dot = 0.0655982 deg/period

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Initial wp = 45 deg
wp_dot = -0.224265 deg/period

r0 = [ -531.312,      5693.87,      3951.33] (km)
magnitude = 6950.93 km

v0 = [  0.82666,      4.34349,      -6.14781] (km)
magnitude = 7.57264 km

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