AOE 4134 Astromechanics Problem Sheet 11

Due 20 November, 2002

Read Chapter 2, sections 2.1 - 2.6, Chapter 4, sections 4.1, 4.2, 4.4.3 to eq 4.4-14, 4.6

50. Use the code developed in problem (47) to find the positions, $\vec{r}$, and velocities , $\vec{V}$,(in the ECI coordinate system) or orbits with the following orbital elements:

Orbit	a	e	i	Ω	ω	ν
1	1.2	0.2	45.0	45.0	45.0	45.0
2	1.2	0.5	90.0	135.0	270.0	135.0
3	1.5	0.1	120.0	265.0	30.0	235.0
4(shuttle)	1.0597	0.0010	51.6415	348.6383	24.6992	52.9671

Will your code handle hyperbolic orbits as well as elliptic orbits? Try it on:

5	-1.2	1.2	45.0	45.0	235.0	100.0

51. Problem 2.5 BMW, page 144-145.

52-54. Write an orbit-determination code that will determine the classical orbital elements, (a, e, i, Ω, ω, and ν) given the position and velocity vectors. It should be capable of handling elliptic, parabolic, and hyperbolic orbits, and indicate when the angle is undefined.

orbit	x	y	z	V_x	V_y	V_z
6	-0.5046	0.5046	0.7137	-0.8179	-0.6861	0.0932
7	-0.6961	0.6961	0.9845	0.1544	-0.1544	0.7454
8	0.7937	0.0684	-1.3591	-0.0674	-0.7735	-0.0004
9	0.3483	0.5849	0.8113	-0.9053	0.3138	0.1634
10	0.5684	0.2865	-0.1993	1.2178	1.5178	0.2122