CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, December 2
2:00 – 3:00 PM
Maria Sanford, Room 101

TWO REMARKS ON THE TWO BODY PROBLEM

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Abstract: For any pair of positive real numbers a and b, let us think of the hyperbola

$$\{(x,y) : x^2/a^2-y^2/b^2 = 1\}$$

The set above has two connected components called branches of the hyperbola and there are two special points in the plane containing them called foci. When we place one of the branches on a line and we role the hyperbola, the foci trace two U shaped curves. Curves built by rolling one curve on another one are called roulettes.

In this talk we will explain two properties of the Planet-Sun motion assuming they move accordingly to Newton's Law. In the case of Mercury the properties read as follow:

1. There is an inertial frame of reference from which the motion center of mass, CM, of Mercury-Sun system moves with velocity 10,059 m/s and "mathematically" Mercury moves with constant speed 48,917.7 meters per seconds.
2. There is an inertial frame of reference from which the motion of the Mercury-Sun CM system moves with velocity 4,112.8 m/s and the trajectory of Mercury "numerically" is the roulette generated by rolling the hyperbola

$$\{(x,y) : x^2/a^2-y^2/b^2 = 1\} \text{ with } a=5.79092 \text{ E10 and } b=3.33281 \text{ E11}$$

This is a work in progress. The speaker is trying to change the word "numerically" above by the word "mathematically" or is trying to understand why, numerically to the naked eye, it is impossible to tell the difference between the trajectory of the planet viewed under the new inertial frame and the roulette of the hyperbola. Similar information will be provided for Mars, the Earth, Venus and Jupiter.

For further information:
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