Kepler Report

1. Problem

Apply Newton method on Kepler’s equation to figure out the position of an object in an elliptical orbit.

2. Description of Work

1) Find derivate function of Kepler’s equation with parameter t.

2) Make Test routing kepler.m

For each time value t in {0, 0.001, 0.002, …, 10}, Use Newton’s method to solve Kepler’s equation for w.

The initial guess for each solve should be the solution from the previous value of t(start the first solve off with an initial guess of w = 0)

Using the formula for the radial position of an object at angle w in it’s elliptical orbit, computer the Cartesian coordinates of the object, x(t) = rcos(w), y(t) =sin(w).

create three plots: *x*(*t*) vs *t*, *y*(*t*) vs *t*, and *y*(*t*) vs *x*(*t*).

3. Discussion of test results

In Kepler’s equation , a = 2.0, b = 1.25,

…

…

t = 9.9760000, w(t) = -9.7365481

t = 9.9770000, w(t) = -9.7371218

t = 9.9780000, w(t) = -9.7376956

t = 9.9790000, w(t) = -9.7382695

t = 9.9800000, w(t) = -9.7388433

t = 9.9810000, w(t) = -9.7394173

t = 9.9820000, w(t) = -9.7399913

t = 9.9830000, w(t) = -9.7405653

t = 9.9840000, w(t) = -9.7411393

t = 9.9850000, w(t) = -9.7417135

t = 9.9860000, w(t) = -9.7422876

t = 9.9870000, w(t) = -9.7428618

t = 9.9880000, w(t) = -9.7434361

t = 9.9890000, w(t) = -9.7440104

t = 9.9900000, w(t) = -9.7445847

t = 9.9910000, w(t) = -9.7451591

t = 9.9920000, w(t) = -9.7457335

t = 9.9930000, w(t) = -9.7463080

t = 9.9940000, w(t) = -9.7468826

t = 9.9950000, w(t) = -9.7474571

t = 9.9960000, w(t) = -9.7480318

t = 9.9970000, w(t) = -9.7486064

t = 9.9980000, w(t) = -9.7491812

t = 9.9990000, w(t) = -9.7497559

t = 10.0000000, w(t) = -9.7503307

