## **UGGGGHHHHHHHHHHHHHHHHHH**

```
In [ ]:
         def f(r,t):
             x = r[0]
             y = r[1]
             a =
             b =
             g =
             d =
             fx = a*x-b*x*y
             return(np.array([fx,fy],float))
         def cRK4(f, tf, x0, v0, t0=0, dt=2**-5):
             r = np.array([x0,v0],float) # initial condition
             tpoints = np.arange(t0, tf, dt)
             xpoints = []
vpoints = []
             for t in tpoints:
                 xpoints.append(r[0])
                 vpoints.append(r[1])
                 k1 = dt*f(r,t)
                 k2 = dt*f(r+0.5*k1,t+0.5*dt)
                 k3 = dt*f(r+0.5*k2,t+0.5*dt)
                 k4 = dt*f(r+k3, t+dt)
                  r = r + (k1+2*k2+2*k3+k4)/6
             return(tpoints, xpoints, vpoints)a
```

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