Elaboradopor : FranciscoJavierTrivenoVargas

*y′′***[***t***] =** *g* **+** Fdist[***t***] − ***K*mag*i***[***t***]**2 ;**

***M***

***My***[***t***]**2**

*y***[***t***] = x1[***t***];**

*y′***[***t***] = x2[***t***];**

x1p = x2[*t*]; x2p = *y′′*[*t*];

**eqt =** {**x1p***,* **x2p**}**/.** *g* → **9***.***81***, M* → **8***, K*mag → **17***.***8 10***−*6*,* **Fd**ist**[***t***]** → *.***1***, i***[***t***]** → **4***.***1996**} **;**

tf = 7*π*;

}

**sol = NDSolve x1***′***[***t***] == eqt[[1]]***,* **x2***′***[***t*]**==e**qt[[**2]]***,* x1[0**] == 2 10***−*3*,* x2[0] **== 0** *,*

{**x1***,* **x2**}*,* {*t,* **0***,* **tf**}**];**

**Plot[**{**x1[***t*]/.sol[[**1***,* **1]]**}*,* {*t,* **0***,* **tf**}**];**

Pl**ot[**{**x2[***t*]/.sol[[1*,* **2]]**}*,* {*t,* **0***,* **tf**}**];** Pl**ot[**{**x1[***t*]/**.sol[[1***,* **1]]***,* **x2[***t*]/**.sol[[1***,* **2]]**}*,* {*t,* **0***,* **tf**}**];**

**ParametricPlot[**{**x1[***t*]/**.sol[[1***,* **1]]***,* **x2[***t*]/**.sol[[1***,* **2]]**}*,* {*t,* **0***,* **tf**}*,*

AspectRatio → Automatic];

x1p = x2[*t*];

**x2p = 9***.***81 +** Fdist[***t***] − Ia[***t***]**2 *K*mag ;**

}

***M***

x1[***t***]**2 *M***

**eqs =** {**x1p***,* **x2p**}**/.** *g* → **9***.***81***, M* → **8***, K*mag → **17***.***8** ∗ **10***−*6*,* **Fd**i**st[***t***]** → **0***,* **Ia[***t***]** → **4***.***1996 ;**

*x* **=** {**x1[***t***]***,* **x2[***t***]**}**;**

Sol**ve[eqs==0***,* {**x1[***t***]***,* **x2[***t***]**}**]**

{{x1[*t*] → −0*.*00200004*,* x2[*t*] → 0*.*}*,* {x1[*t*] → 0*.*00200004*,* x2[*t*] → 0*.*}}

x1p = x2[*t*];

**x2p = 9***.***81 +** Fdist[***t***] − Ia[***t***]**2 *K*mag ;**

}

***M***

x1[***t***]**2 *M***

**eqs =** {**x1p***,* **x2p**}**/.** *g* → **9***.***81***, M* → **8***, K*mag → **17***.***8** ∗ **10***−*6*,* **Ia[***t***]** → **4***.***1996 ;**

*x* **=** {**x1[***t***]***,* **x2[***t***]**}**;**

*A* **=** 0I**dentit**yM**atrix[2];**

**Do** *A***[[***i, j***]] = FullSimplify** *∂****x***[[***j***]]**eqs[[***i***]]** *,* {*j,* **1***,* **2**}*,* {*i,* **1***,* **2**} **;** Ma**t**r**ixForm[***A***]**

 0 1 

0*.*000078483

x1[*t*]3

}



0 

**Ae = Ful**lSim**plify** *A***/. x1[***t***]** → **2***.***005 10***−*3 **;** Matrix**Form[Ae]**

 0 1 

 9737*.*17 0 

x1p = x2[*t*];

**x2p = 9***.***81 +** Fdist[***t***] − Ia[***t***]**2 *K*mag ;**

}

***M***

x1[***t***]**2 *M***

**eqs =** {**x1p***,* **x2p**}**/.** *g* → **9***.***81***, M* → **8***, K*mag → **17***.***8 10***−*6 **;**

*x* **=** {**x1[***t***]***,* **x2[***t***]**}**;**

*B* **=** {{**0***,* **0**}*,* {**0***,* **0**}}**;**

*F* **=** {**Ia[***t***]***,* **Fd**i**st[***t***]**}**;**

**Do** *B***[[***i, j***]] = FullSimplify** *∂****F*** [[***j***]]**eqs[[***i***]]** *,* {*j,* **1***,* **2**}*,* {*i,* **1***,* **2**} **;** Ma**trixForm[***B***]**

 0 0 

4.45`\**∧*-6Ia[*t*] x1[*t*]2

1

8

 −



**Be = F**ull**Simplify** *B***/. x1[***t***]** → **2***.***005 10***−*3*,* **Ia[***t***]** → **4***.***1996 ;** Mat**rixForm[Be]**

}

 0 0 

 −4*.*64878 1



8