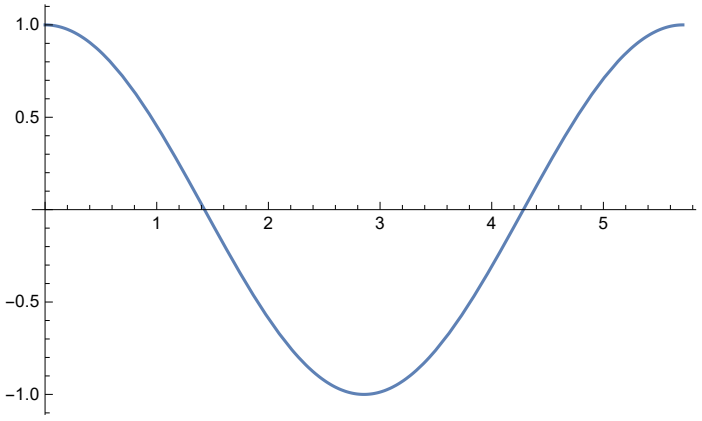
In[]:=
```
F1[X1_, X2_] = X1 / 10 - X2^3 - X1 * X2^2 - X1^2 * X2 - X2 - X1^3;
F2[X1_, X2_] = X1 + X2 / 10 + X1 * X2^2 + X1^3 - X2^3 - X1^2 * X2;

J[X1_, X2_] =
  {{D[F1[X1, X2], X1], D[F1[X1, X2], X2]}, {D[F2[X1, X2], X1], D[F2[X1, X2], X2]}};

mu0 = 1 / 10;
w0 = 1;
v0 = 1;
x0 = Sqrt[mu0];
tMax = 2 * Pi / (w0 + mu0 * v0);

eqns = {{{M11'[t], M12'[t]}, {M21'[t], M22'[t]}} ==
    J[X1[t], X2[t]].{{M11[t], M12[t]}, {M21[t], M22[t]}},
   X1'[t] == F1[X1[t], X2[t]],
   X2'[t] == F2[X1[t], X2[t]],
   M11[0] == 1,
   M12[0] == 0,
   M21[0] == 0,
   M22[0] == 1,
   X2[0] == 0,
   X1[0] == x0};

sol = NDSolve[eqns, {X1[t], X2[t], M11[t], M12[t], M21[t], M22[t]}, {t, 0, tMax}];

MT = {{M11[t], M12[t]}, {M21[t], M22[t]}} /. sol[[1]] /. t → tMax
Plot[M22[t] /. sol, {t, 0, tMax}]
```

Out[]= $\left\{\left\{0.319053, 2.12317 \times 10^{-8}\right\}, \{0.680947, 1.\}\right\}$

Out[]=



In[]:=
```
Log[Eigenvalues[MT]] / tMax
```

Out[]= $\left\{5.78753 \times 10^{-9}, -0.2\right\}$