

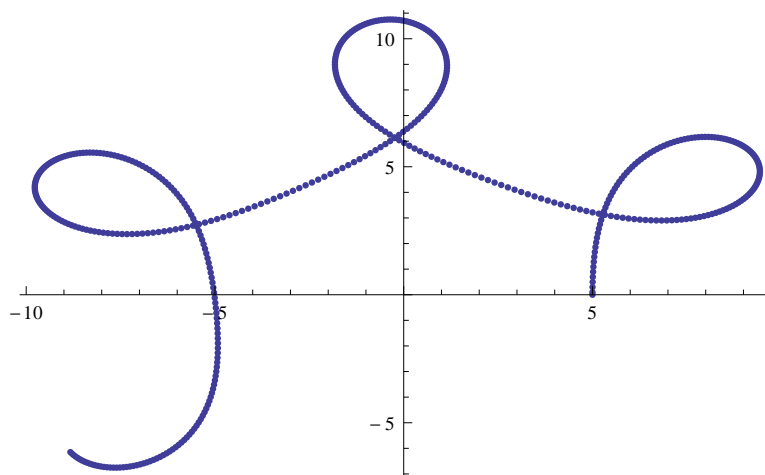
# Phasenraum für Pendel mittels 4th-Order Runge Kutta

```
<< VectorAnalysis`

f[u_] := {-u[[2]] / Norm[u[[2]]]^3 - e - CrossProduct[u[[1]], b], u[[1]]}
h = 0.2; n = 1000; Z = 0; u = {{0, 0.5, 0}, {5, 0, 0}}; U = {u};
e = {0, 0, 0}; b = {0, 0, -0.1};
Do[
  Z++;

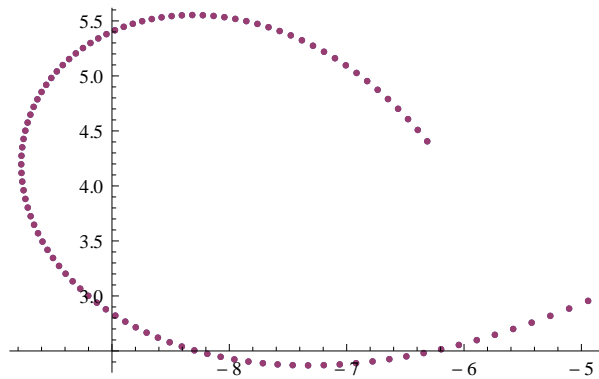
  k0 = h * f[u]; k1 = h * f[u + k0 / 2]; k2 = h * f[u + k1 / 2]; k3 = h * f[u + k2];
  u += 1 / 6 * (k0 + 2 k1 + 2 k2 + k3);
  If[Mod[Z, 2] == 1,
    AppendTo[U, u];];

, {n}]
ListPlot[#[[2]][[1 ;; 2]] & /@ U]
```



```
a = 300; b = 400;
```

```
ListPlot[{{#[[2]][[1 ;; 2]] & /@ U[[a ;; b]], #[[2]][[1 ;; 2]] & /@ F[[a ;; b]]}]
```



```
U[[400 ;; 400]]
```

```
{{{0.199919, -0.264362, 0.}, {-6.31175, 4.40444, 0.}}}
```

```
F = U;
```

```
#[[2]][[1 ;; 2]] & /@ U [[5 ;; 8]]
```

```
{{{-0.08, -0.08}, {-0.125, -0.125}, {-0.18, -0.18}, {-0.245, -0.245}}}
```

```
{{{-0.0399893, -0.000799893, 0.}, {-0.000799893, -0.0000106658, 0.}}}
```

```
Exit[]
```

```
a = 3
```

```
3
```