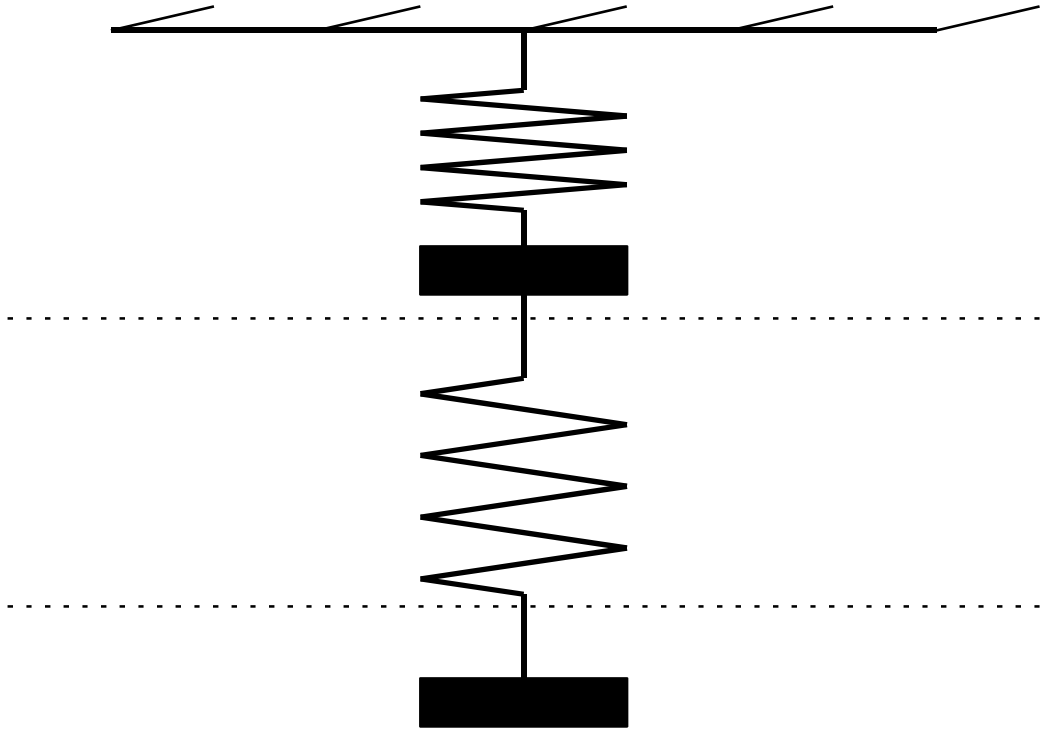
```
> read("d:/340/Projects/DoubleSpringMass.mpl"):
  read("d:/340/Projects/RungeKutta.mpl"):
> DoubleSpringMass([6,6],[1,1],[-1,2]);
```



The model

$$\begin{cases} m_1 \ddot{s}_1 = -k_1 s_1 + k_2 (s_2 - s_1) \\ m_2 \ddot{s}_2 = -k_2 (s_2 - s_1) \end{cases} \qquad t \in [0, T]$$

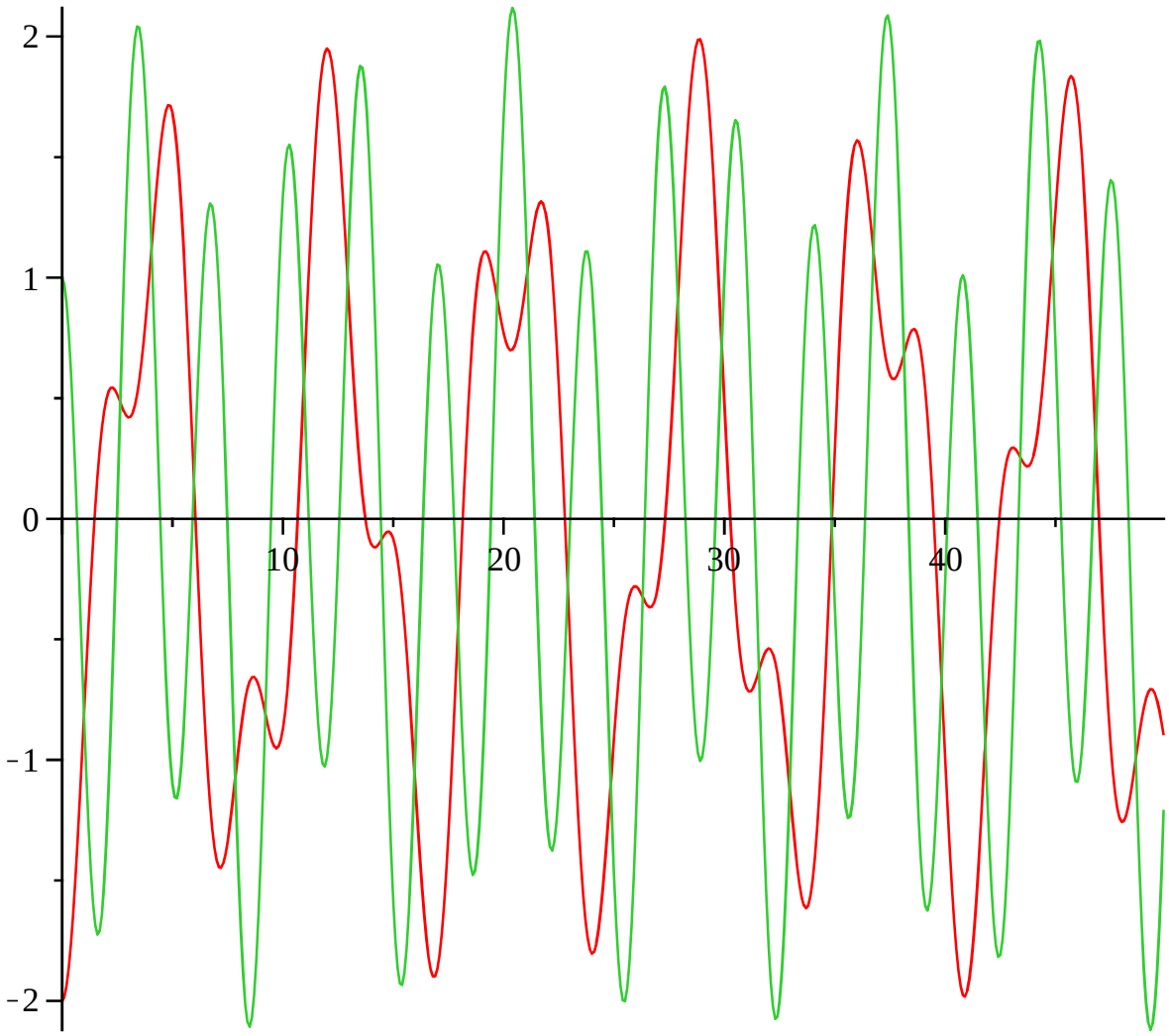
$$s_1(0) = z_1, \quad s_2(0) = z_2, \quad \dot{s}_1(0) = z_3, \quad \dot{s}_2(0) = z_4$$

Let $u_1 = s_1$, $u_2 = s_2$, $u_3 = \dot{s}_1$, $u_4 = \dot{s}_2$

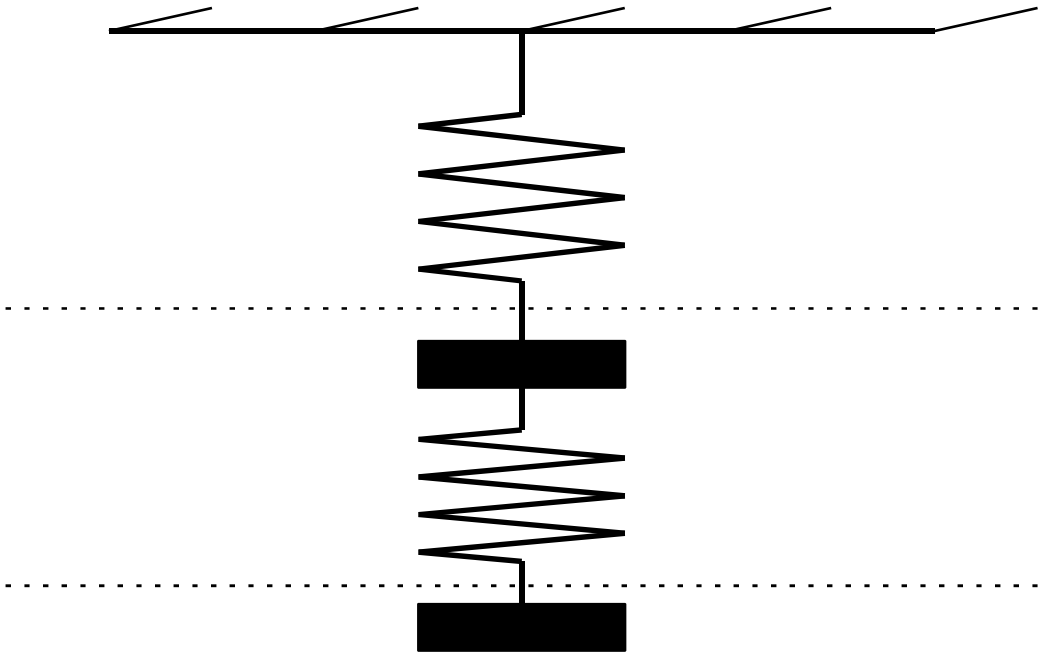
$$\begin{cases} \dot{u}_1 = u_3 \\ \dot{u}_2 = u_4 \\ \dot{u}_3 = -\frac{k_1 u_1}{m_1} + \frac{k_2}{m_1}(u_2 - u_1) \\ \dot{u}_4 = -\frac{k_2}{m_2}(u_2 - u_1) \end{cases} \qquad t \in [0, T]$$

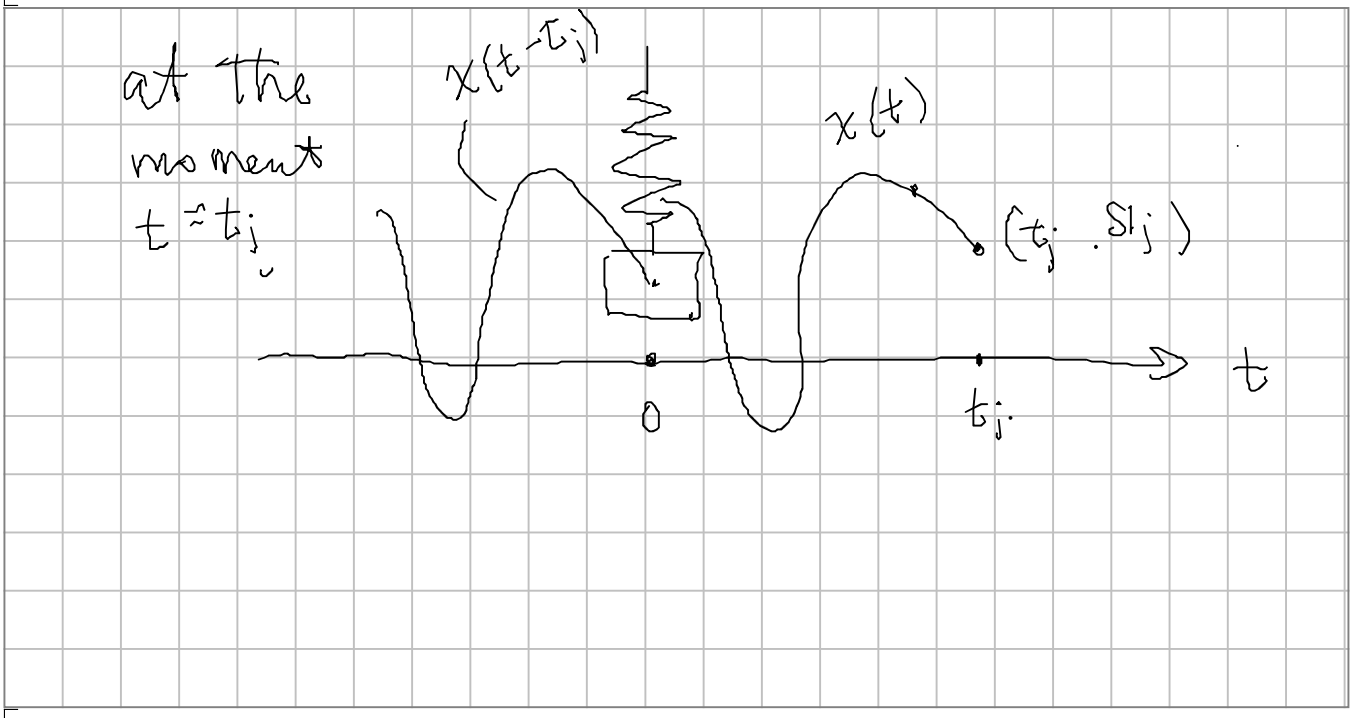
$$u_1(0) = z_1, \quad u_2(0) = z_2, \quad u_3(0) = z_3, \quad u_4(0) = z_4$$

```
> f := Vector(4) : m1, m2 := 1, 1 : k1, k2 := 2, 1 :
  f[1] := (t, a, b, c, d) → c :
  f[2] := (t, a, b, c, d) → d :
  f[3] := (t, a, b, c, d) → (k2/m1) * (b-a) - (k1/m1) * a :
  f[4] := (t, a, b, c, d) → -(k2/m2) * (b-a) :

> α, β := 0, 50 : x0 := [-1, 2, 0, 0] : n := 500 :
  s, u := RungeKutta( f, α, β, x0, n ) :

> m := n :
  t, s1, s2 := s, u[1], u[2] :

> plot( {[seq( [t[j], -s1[j]], j = 1..m)], [seq( [t[j], -s2[j]], j = 1..m)]} );
```

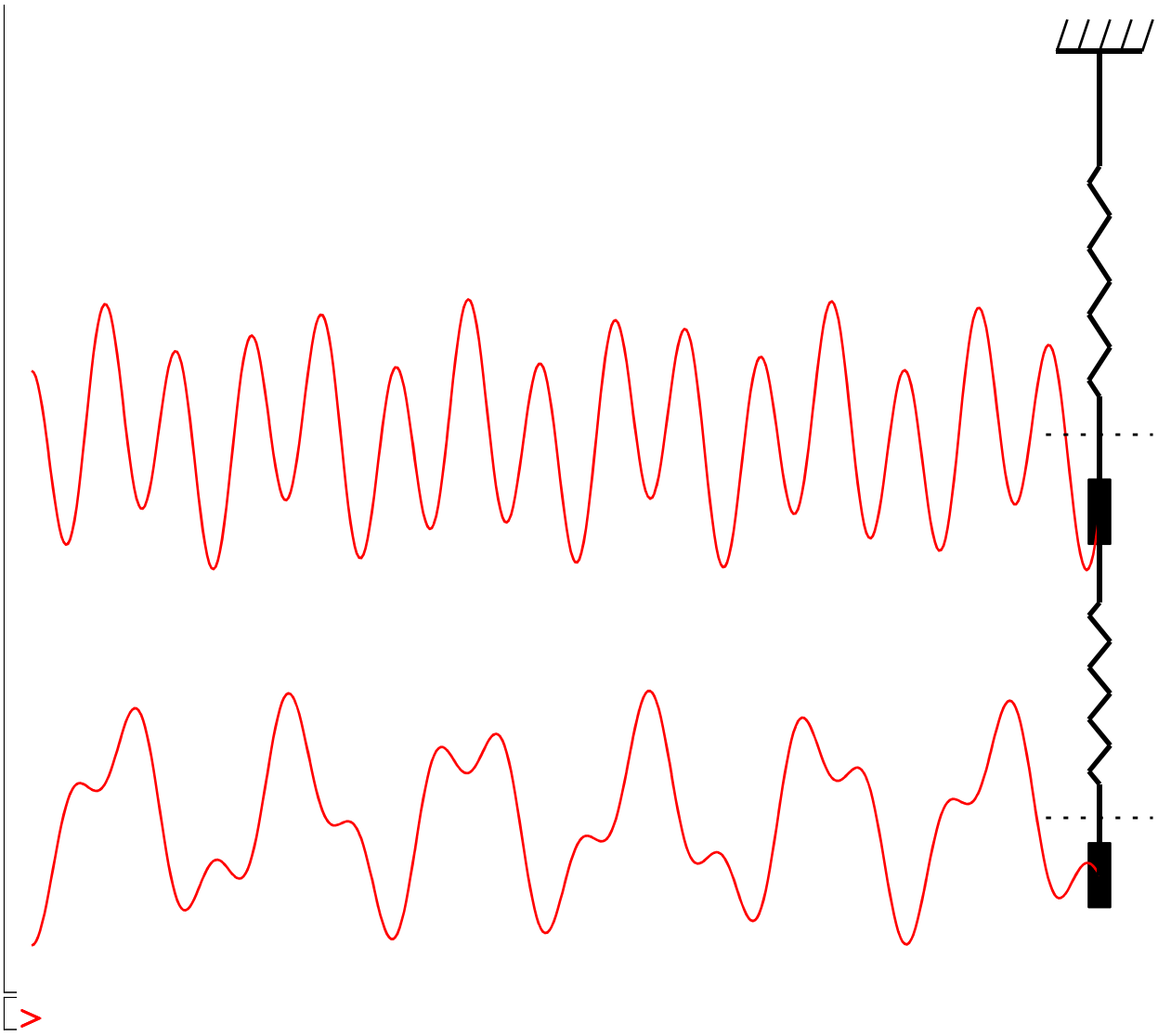



```
> p := Vector(m) : # the vector of frames
  for k from 1 to n do
    p[k] := DoubleSpringMass([6, 6], [1, 1], [s1[k], s2[k]])
  end do:
> plots[display]([seq(p[k], k = 1 ..n)], insequence = true);
```






```
> p := Vector(m) :  # the vector of frames
  for k from 1 to m do
    pt1 := plot([seq([t[j] - t[k], -s1[j] - 6], j = 1..k)]) :
    pt2 := plot([seq([t[j] - t[k], -s2[j] - 12], j = 1..k)]) :
    p[k] := plots[display]([pt1, pt2, DoubleSpringMass([6, 6], [1, 1], [s1[k], s2[k]])])
  end do:

> plots[display]([seq(p[k], k = 1..m)], insequence = true);
```


t