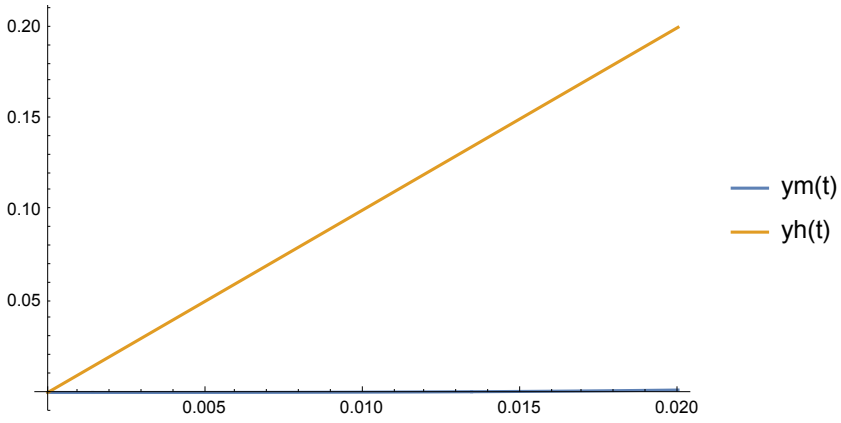
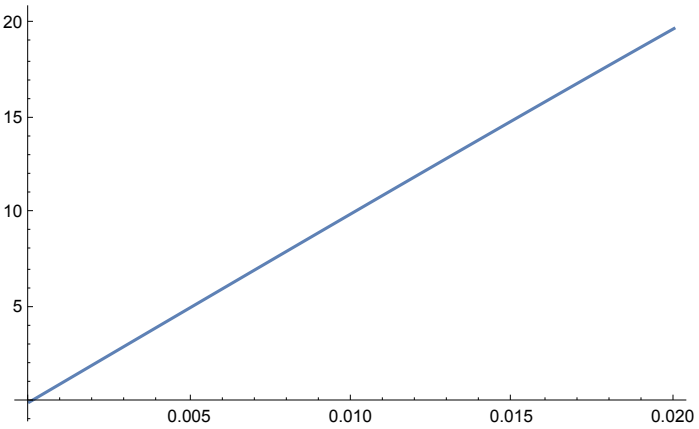
In[131]:=
```
ClearAll["Global`*"];
v = 10;  (* pull very quickly *)
tmax = 0.2 / v;
m = 1.0;
g = 9.8;
k = 100.0;
ym0 = m g / k;
yh[t_] := ym0 + v t;
Ta[t_] := (ym[t] - ym0) k + m g;
Tb[t_] := (yh[t] - ym[t]) k;
soln = NDSolve[{
     ym[0] == ym0,
     ym'[0] == 0,
     m ym''[t] == m g + Tb[t] - Ta[t]
   }, ym[t], {t, 0, tmax}];
ymsoln[t_] := ym[t] /. soln;
Plot[{ymsoln[t] - ym0, yh[t] - yh[0]},
 {t, 0, tmax}, PlotLegends → {"ym(t)", "yh(t)"}]
Plot[((m g + Tb[t] - Ta[t]) / m) /. soln, {t, 0, tmax},
 PlotLegends → "acceleration of block m"]
Plot[{Ta[t] /. soln, Tb[t] /. soln}, {t, 0, tmax}, PlotLegends → "Expressions"]
```

Out[142]=

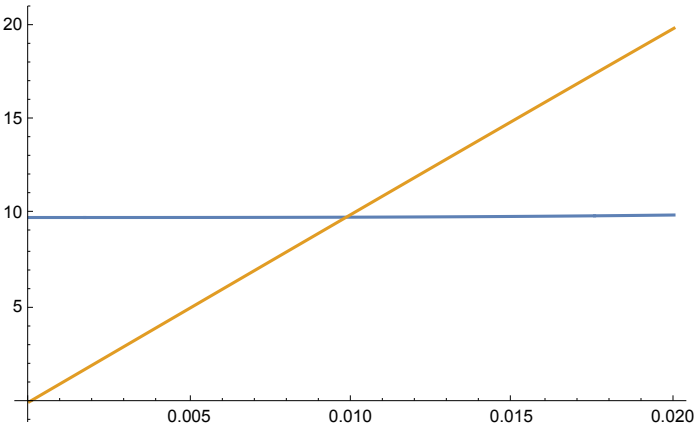


Out[143]=



acceleration of block m

Out[144]=

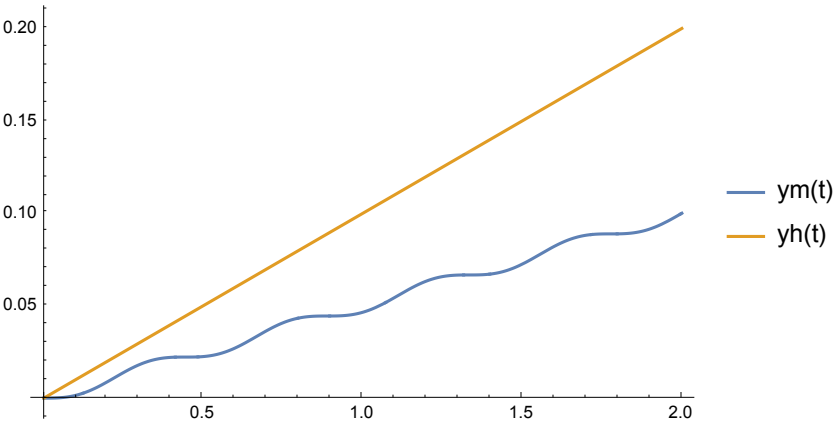


Ta(*t*) /. soln

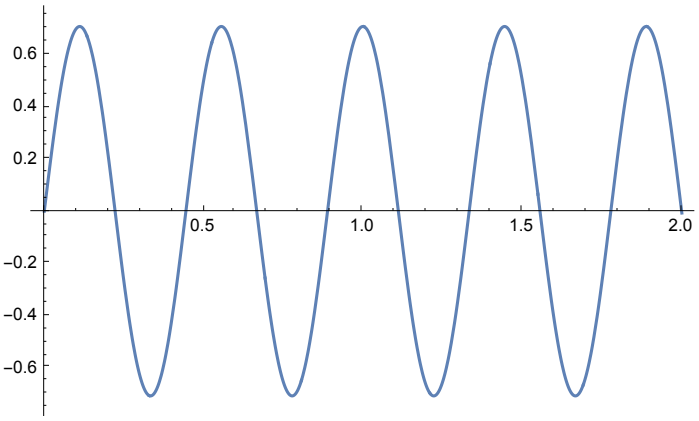
Tb(*t*) /. soln

In[145]:=
```
ClearAll["Global`*"];
v = 0.1;  (* pull very slowly *)
tmax = 0.2 / v;
m = 1.0;
g = 9.8;
k = 100.0;
ym0 = m g / k;
yh[t_] := ym0 + v t;
Ta[t_] := (ym[t] - ym0) k + m g;
Tb[t_] := (yh[t] - ym[t]) k;
soln = NDSolve[{
     ym[0] == ym0,
     ym'[0] == 0,
     m ym''[t] == m g + Tb[t] - Ta[t]
   }, ym[t], {t, 0, tmax}];
ymsoln[t_] := ym[t] /. soln;
Plot[{ymsoln[t] - ym0, yh[t] - yh[0]},
 {t, 0, tmax}, PlotLegends → {"ym(t)", "yh(t)"}]
Plot[((m g + Tb[t] - Ta[t]) / m) /. soln, {t, 0, tmax},
 PlotLegends → "acceleration of block m"]
Plot[{Ta[t] /. soln, Tb[t] /. soln}, {t, 0, tmax}, PlotLegends → "Expressions"]
```

Out[156]=



Out[157]=



acceleration of block m

Out[158]=