In[64]:=
```
data = Rest@First@Import["http://walter.imcpl.at/~wschrabi/IVS/Mathe/SOIL.XLS"];

f[pm_?NumericQ, pim_?NumericQ, Dm_?NumericQ] :=
 Module[{t0 = 0.0104167, Vm = 100, a = 5800, L = 80, eqns, solu, dudx, gamma,
   init, alpha, beta, h}, gamma = PDF[GammaDistribution[alpha, beta], t];
  init = a * t0 * gamma /. {alpha → 2, beta → t0 / 2};
  eqns = {D[u[x, t], t] == Dm * D[u[x, t], x, x] - Vm * D[u[x, t], x] - pm * (u[x, t] - v[x, t]),
    D[v[x, t], t] == pim * (u[x, t] - v[x, t]), u[x, 0] == 0, v[x, 0] == 0,
    u[0, t] - Dm * (Derivative[1, 0][u][0, t] / Vm) == init,
    u[L, t] + Dm * (Derivative[1, 0][u][L, t] / Vm) == 0};
  solu = u /. First@NDSolve[eqns, {u, v}, {t, 0, 2.55}, {x, 0, L}];
  h[t_, x_] := Evaluate[solu[x, t] - Dm / Vm * D[solu[x, t], x]];
  Plus @@ ((h[#[[1]], 1 / 2 L] - #[[2]])^2 & /@ data[[All, {2, 6}]])]
pts = {};
Dynamic[Graphics[{Red, Thick, Line[pts]},
  AxesLabel → {"pm", "pim", "Dm"}, Frame → True, PlotRange → {{0, 30}, {0, 30}}]]

results = NMinimize[f[pm, pim, Dm], {{pm, 1, 100}, {pim, 1, 10}, {Dm, 100, 500}}]
```

NDSolve::eerr :
Warning: Scaled local spatial error estimate of 18.35174551759749` at t = 2.55` in the direction of independent variable x is much greater than prescribed error tolerance. Grid spacing with 25 points may be too large to achieve the desired accuracy or precision. A singularity may have formed or you may want to specify a smaller grid spacing using the MaxStepSize or MinPoints method options. ≫

NDSolve::eerr :
Warning: Scaled local spatial error estimate of 24.07417007272414` at t = 2.55` in the direction of independent variable x is much greater than prescribed error tolerance. Grid spacing with 25 points may be too large to achieve the desired accuracy or precision. A singularity may have formed or you may want to specify a smaller grid spacing using the MaxStepSize or MinPoints method options. ≫

NDSolve::eerr :
Warning: Scaled local spatial error estimate of 195.9878634907248` at t = 2.55` in the direction of independent variable x is much greater than prescribed error tolerance. Grid spacing with 25 points may be too large to achieve the desired accuracy or precision. A singularity may have formed or you may want to specify a smaller grid spacing using the MaxStepSize or MinPoints method options. ≫

General::stop : Further output of NDSolve::eerr will be suppressed during this calculation. ≫

Out[68]=
```
{1033.32, {pm → 10.8929, pim → 5.76796, Dm → 352.35}}
```

In[69]:=
```
plotdata = ListPlot[data[[All, {2, 6}]]];
```

In[70]:=
```
hplot[pm_?NumericQ, pim_?NumericQ, Dm_?NumericQ, tt_?NumericQ] :=
 Module[{t0 = 0.0104167, Vm = 100, a = 5800, L = 80, eqns, solu, dudx, gamma,
   init, alpha, beta, h}, gamma = PDF[GammaDistribution[alpha, beta], t];
  init = a * t0 * gamma /. {alpha → 2, beta → t0 / 2};
  eqns = {D[u[x, t], t] == Dm * D[u[x, t], x, x] - Vm * D[u[x, t], x] - pm * (u[x, t] - v[x, t]),
    D[v[x, t], t] == pim * (u[x, t] - v[x, t]), u[x, 0] == 0, v[x, 0] == 0,
    u[0, t] - Dm * (Derivative[1, 0][u][0, t] / Vm) == init,
    u[L, t] + Dm * (Derivative[1, 0][u][L, t] / Vm) == 0};
  solu = u /. First@NDSolve[eqns, {u, v}, {t, 0, 2.55}, {x, 0, L}];
  h[t_, x_] := Evaluate[solu[x, t] - Dm / Vm * D[solu[x, t], x]];
  (h[tt, 1 / 2 L])]
```

In[71]:=
```
modelplot =
  Plot[{hplot[pm, pim, Dm, tt] /. results[[2]]}, {tt, 0, 2.55}, PlotStyle → {Red}];
```

In[72]:=
```
Show[plotdata, modelplot]
```

Out[72]=