In[1885]:=
```
data = {{0, 89.5, 0.8344, 400, 35 132.147, 0.004}, {1, 86.1, 1.189, 495, 37 486, 0.213},
    {2, 72.5, 2.025, 453, 40 850, 0.408}, {3, 84.9, 1.252, 437, 42 334, 0.451},
    {4, 49.0, 2.960, 432, 43 008, 0.469}, {5, 71, 1.490, 483, 41 820, 0.143},
    {6, 82.8, 2.039, 433, 42 070, 0.16}, {7, 93.0, 1.862, 428, 32 801, 0.174},
    {8, 87.0, 2.222, 374, 43 025, 0.179}, {9, 89.9, 1.470, 373, 43 882, 0.199},
    {10, 86.9, 1.783, 364, 44 016, 0.201}, {11, 100.0, 2.094, 361, 44 950, 0.22},
    {12, 85.0, 2.297, 355, 45 270, 0.23}, {13, 91.6, 2.705, 350, 45 650, 0.244},
    {14, 108.5, 2.123, 347, 46 050, 0.25}, {15, 110.6, 0.9929, 343, 46 370, 0.254},
    {16, 109.2, 2.637, 339, 46 680, 0.262}, {17, 103.4, 2.545, 332, 47 100, 0.266},
    {18, 106.3, 2.742, 328, 48 700, 0.285}, {19, 108.4, 2.945, 324, 49 500, 0.292},
    {20, 110.8, 3.143, 219, 49 820, 0.302}, {21, 113.7, 3.057, 372, 49 445.135, 0.280},
    {22, 118.1, 3.453, 369, 49 799.44, 0.289},
    {23, 117.8, 3.924, 367, 49 922.022, 0.292}, {24, 124.9, 3.879,
     365, 50 161.21, 0.297}, {25, 114.8, 3.714, 361, 50 525.289, 0.305},
    {26, 130.5, 3.527, 354, 50 885.237, 0.312}, {27, 121.2, 4.735, 352,
     51 696.298, 0.324}, {28, 129.5, 6.093, 342, 53 607.162, 0.335},
    {29, 129.2, 4.313, 334, 54 584.194, 0.346}, {30, 135.7, 4.991, 338,
     54 664.037, 0.371}, {31, 138.3, 4.798, 332, 54 700.803, 0.344},
    {32, 144.8, 6.136, 328, 55 471.001, 0.351}, {33, 146.5, 4.922, 324,
     56 155.978, 0.367}, {34, 152.8, 3.769, 321, 56 890.635, 0.370},
    {35, 157.9, 4.696, 318, 57 062.782, 0.372}, {36, 150.6, 5.331, 316,
     57 520.537, 0.381}, {37, 134.1, 5.191, 312, 58 758.544, 0.388},
    {38, 142.3, 5.431, 313, 58 333.626, 0.401}, {39, 149.6, 5.986, 311,
     58 889.273, 0.412}, {40, 152.1, 6.318, 313, 58 819.638, 0.422},
    {41, 156.5, 5.033, 309, 59 875.573, 0.434}, {42, 174.0, 4.858, 306,
     60 012.439, 0.435}, {43, 166.0, 7.154, 303, 60 469.542, 0.448},
    {44, 165.0, 8.850, 301, 61 385.012, 0.452}, {45, 164.4, 4.934, 297,
     62 068.634, 0.461}, {46, 158.6, 6.373, 293, 62 462.423, 0.465},
    {47, 154.5, 4.092, 291, 62 863.728, 0.473}, {48, 144.9, 8.761, 288,
     63 658.026, 0.488}, {49, 172.8, 4.834, 287, 64 136.861, 0.493},
    {50, 181.0, 5.803, 232, 65 700, 0.536}, {51, 204.5, 5.762, 231, 66 457, 0.535},
    {52, 208.4, 6.216, 229, 66 564, 0.543}, {53, 212.0, 5.819, 226, 66 634.22, 0.533},
    {54, 213.2, 6.012, 226, 69 119.920, 0.550}, {55, 216.8, 6.582, 225,
     69 038.856, 0.557}, {56, 221.9, 6.472, 222, 68 550.328, 0.559},
    {57, 225.8, 6.208, 220, 69 683.158, 0.568}, {58, 228.4, 6.420, 217, 70 505.9, 0.571},
    {59, 231.4, 6.276, 215, 69 605.859, 0.589}, {60, 233.4, 6.306,
     213, 70 855.864, 0.603}, {61, 237.2, 6.294, 212, 71 954.75, 0.610},
    {62, 238.6, 6.385, 210, 72 583.666, 0.615}, {63, 241.7, 6.634, 208,
     72 565.252, 0.621}, {64, 243.7, 6.534, 210, 72 764.173, 0.626},
    {65, 247.3, 6.583, 207, 73 350.179, 0.639}, {66, 250.4, 6.626, 206,
     73 667.279, 0.673}, {67, 254.5, 6.499, 210, 74 036.935, 0.678},
    {68, 256.1, 6.763, 211, 74 546.25, 0.675}, {69, 258.2, 6.702, 206,
     75 905.966, 0.772}, {70, 179.3, 5.996, 204, 77 431.161, 0.784},
    {71, 215.1, 5.688, 241, 77 081.339, 0.704}, {72, 252.4, 7.475, 235,
     77 095.318, 0.708}, {73, 255.2, 7.424, 234, 78 512.565, 0.732},
    {74, 263.1, 7.363, 233, 79 193.381, 0.753}, {75, 266.6, 7.544, 228,
     80 757.477, 0.801}, {76, 268.0, 7.459, 224, 82 842.43, 0.840},
    {77, 270.5, 7.113, 220, 82 744.254, 0.840}, {78, 273.6, 7.872, 219,
     83 908.467, 0.848}, {79, 277.2, 7.454, 215, 85 829.529, 0.850},
    {80, 279.0, 7.510, 212, 86 327.636, 0.846}, {81, 281.1, 7.546, 211,
     87 063.809, 0.858}, {82, 285.3, 7.429, 210, 87 764.648, 0.862},
    {83, 286.6, 7.880, 208, 89 036.206, 0.865}, {84, 291.1, 7.578, 208,
     88 383.408, 0.867}, {85, 293.4, 7.781, 206, 89 184.064, 0.858},
    {86, 294.9, 7.903, 204, 89 963.312, 0.868}, {87, 295.7, 7.842, 203,
     90 342.628, 0.866}, {88, 297.4, 7.886, 202, 91 270.112, 0.872},
```

```
    {89, 303.6, 8.098, 200, 92 767.773, 0.874}, {90, 313.9, 7.686, 200,
     92 808.262, 0.878}, {91, 312.9, 7.951, 197, 93 586.318, 0.874},
    {92, 314.2, 7.980, 195, 95 211.781, 0.882}, {93, 317.7, 7.992, 194,
     94 823.477, 0.875}, {94, 322.7, 8.222, 192, 95 427.889, 0.877},
    {95, 324.3, 8.122, 191, 96 382.883, 0.882}, {96, 327.2, 8.268, 190,
     97 512.059, 0.877}, {97, 329.5, 8.313, 188, 98 066.34, 0.880},
    {98, 332.7, 8.277, 187, 98 427.538, 0.882}, {99, 335.7, 8.434, 185,
     99 034.261, 0.882}, {100, 335.4, 8.623, 180, 102 584.497, 0.882},
    {101, 336.1, 8.589, 177, 103 141.502, 0.885}, {102, 340, 8.906, 176,
     104 110.959, 0.887}, {103, 341.3, 8.875, 174, 105 461.491, 0.889},
    {104, 345.6, 8.835, 173, 105 806.233, 0.890}, {105, 346.2, 8.712, 171,
     104 867.615, 0.892}, {106, 350.2, 9.011, 169, 107 401.499, 0.894},
    {107, 353.1, 9.003, 168, 108 077.396, 0.893}, {108, 355.3, 9.015, 167,
     109 046.999, 0.896}, {109, 358.1, 9.059, 166, 109 381.367, 0.895},
    {110, 359.6, 9.128, 163, 110 243.441, 0.894}, {111, 363.9, 9.305, 167,
     111 285.209, 0.902}, {112, 367.6, 9.331, 165, 112 572.665, 0.902},
    {113, 369.7, 9.295, 161, 113 506.747, 0.905}, {114, 372.9, 9.362, 160,
     114 287.953, 0.903}, {115, 376.4, 9.189, 158, 114 868.601, 0.906},
    {116, 377.5, 9.319, 157, 116 015.962, 0.904}, {117, 378.8, 9.277, 158,
     116 014.939, 0.907}, {118, 384.7, 9.257, 157, 117 082.131, 0.909}};

capacitance = data[[All, {1, 2}]];
frequency = data[[All, {1, 4}]];
time = data[[All, {1, 5}]];
compensated = data[[All, {1, 6}]];

(*
    Capacitância
*)
plot = ListPlot[capacitance, Joined → True,
   AxesLabel → {"Volume (mL)", "Capacitância (pF)"}, PlotLabel →
    "Função de Transferência Experimental - Capacitância", ImageSize → Full];
Export[NotebookDirectory[] <> "/Images/Nivel/Experimental/Capacitancia.pdf", plot];

model = NonlinearModelFit[capacitance, a + m V, {a, m}, V];
Normal[model]
model["RSquared"]
capacitanceModel = model;

D[model[V], V]

plot =
  Show[Plot[model[V], {V, Min[capacitance[[All, 1]]], Max[capacitance[[All, 1]]]},
    AxesLabel → {"Volume (mL)", "Capacitância (pF)"},
    PlotLabel → "Função de Transferência Experimental Ajustada - Capacitância",
    ImageSize → Full],
   ListPlot[capacitance, AxesLabel → {"Volume (mL)", "Capacitância (pF)"},
    PlotLabel → "Função de Transferência Experimental - Capacitância",
    ImageSize → Full, PlotStyle → Orange]
  ];
Export[NotebookDirectory[] <>
   "/Images/Nivel/Experimental/Capacitancia-Ajuste.pdf", plot];

(*
    Frequência
```

```
*)
plot = ListPlot[frequency, Joined → True,
    AxesLabel → {"Volume (mL)", "Frequência (Hz)"}, PlotLabel →
     "Função de Transferência Experimental - Frequência", ImageSize → Full];
Export[NotebookDirectory[] <> "/Images/Nivel/Experimental/Frequencia.pdf", plot];

model = NonlinearModelFit[frequency, a + m V, {a, m}, V];
Normal[model]
model["RSquared"]
frequencyModel = model;

D[model[V], V]

plot = Show[Plot[model[V], {V, Min[frequency[[All, 1]]], Max[frequency[[All, 1]]]},
     AxesLabel → {"Volume (mL)", "Frequência (Hz)"},
     PlotLabel → "Função de Transferência Experimental Ajustada - Frequência",
     ImageSize → Full],
    ListPlot[frequency, AxesLabel → {"Volume (mL)", "Frequência (Hz)"},
     PlotLabel → "Função de Transferência Experimental - Frequência",
     ImageSize → Full, PlotStyle → Orange]
  ];
Export[
  NotebookDirectory[] <> "/Images/Nivel/Experimental/Frequencia-Ajuste.pdf", plot];


(*
    Ciclos
*)
plot = ListPlot[time, Joined → True, AxesLabel → {"Volume (mL)", "Ciclos"},
    PlotLabel → "Função de Transferência Experimental - Ciclos", ImageSize → Full];
Export[NotebookDirectory[] <> "/Images/Nivel/Experimental/Ciclos.pdf", plot];

model = NonlinearModelFit[time, a + m V, {a, m}, V];
Normal[model]
model["RSquared"]
timeModel = model;

D[model[V], V]

plot = Show[Plot[model[V], {V, Min[time[[All, 1]]], Max[time[[All, 1]]]},
     AxesLabel → {"Volume (mL)", "Ciclos"}, PlotLabel →
      "Função de Transferência Experimental Ajustada - Ciclos", ImageSize → Full],
    ListPlot[time, AxesLabel → {"Volume (mL)", "Ciclos"},
     PlotLabel → "Função de Transferência Experimental - Ciclos",
     ImageSize → Full, PlotStyle → Orange]
  ];
Export[
  NotebookDirectory[] <> "/Images/Nivel/Experimental/Ciclos-Ajuste.pdf", plot];

(*
    Compensado
*)
plot = ListPlot[compensated, Joined → True,
    AxesLabel → {"Volume (mL)", "Compensado"}, PlotLabel →
     "Função de Transferência Experimental - Compensado", ImageSize → Full];
```

```
Export[NotebookDirectory[] <> "/Images/Nivel/Experimental/Compensado.pdf", plot];

model = NonlinearModelFit[compensated, a + b V + c Power[V, 2], {a, b, c}, V];
Normal[model]
model["RSquared"]
compensatedModel = model;

D[model[V], V]

plot =
  Show[Plot[model[V], {V, Min[compensated[[All, 1]]], Max[compensated[[All, 1]]]},
    AxesLabel → {"Volume (mL)", "Compensado"},
    PlotLabel → "Função de Transferência Experimental Ajustada - Compensado",
    ImageSize → Full],
   ListPlot[compensated, AxesLabel → {"Volume (mL)", "Compensado"},
    PlotLabel → "Função de Transferência Experimental - Compensado",
    ImageSize → Full, PlotStyle → Orange]
  ];
Export[
  NotebookDirectory[] <> "/Images/Nivel/Experimental/Compensado-Ajuste.pdf", plot];
```

Out[1893]= $57.3962 + 2.75376\ V$

Out[1894]= 0.99716

Out[1896]= 2.75376

Out[1902]= $394.095 - 2.24631\ V$

Out[1903]= 0.988086

Out[1905]= −2.24631

Out[1911]= $34\,409.2 + 658.776\ V$

Out[1912]= 0.998731

Out[1914]= 658.776

Out[1920]= $0.133032 + 0.00898593\ V - 0.0000148452\ V^2$

Out[1921]= 0.989612

Out[1923]= $0.00898593 - 0.0000296905\ V$

```
Map[({#1[[1]], SetAccuracy[PlusMinus[#1[[2]], #1[[2]] * 0.03 // N], 1]}) &, time];
Grid[%] // TeXForm;

FindIdealityError[input_, function_] := (
   Max[Map[Abs[function[#1[[1]]] - #1[[2]] + input[[1, 2]]] &, input]] /
    Max[input[[All, 2]]]
  );
```

In[1872]:=
```
CoplanarStripsCapacitance[ϵ_, L_, d_, w_] :=
  ϵ L EllipticK[Sqrt[1 - Power[d^2/(4 (d+w) (d+w)), 2]]] / EllipticK[1/2 Sqrt[d^2/((d+w) (d+w))]];

FullSimplify[(CoplanarStripsCapacitance[8.85 × 10^-12, H - h, d, w] +
    CoplanarStripsCapacitance[80.1 * 8.85 × 10^-12, h, d, w]) / 10^-12]


theoricalCapacitance[H_] =
  (CoplanarStripsCapacitance[8.85 × 10^-12, 135 / 1000 - H, 14 / 1000, 18 / 1000] +
     CoplanarStripsCapacitance[80.1 * 8.85 × 10^-12, H, 14 / 1000, 18 / 1000]) / 10^-12;
theoricalCapacitance[5 V / 6000] /. V → {0, 20, 30, 40, 50, 60, 70, 80, 90, 100}

Expand[theoricalCapacitance[5 V / 6000] // N]
D[theoricalCapacitance[5 V / 6000], V]

Expand[theoricalCapacitance[h] // N]
D[theoricalCapacitance[h / 1000], h]

Print["Erro de Linearidade = ",
 FindIdealityError[capacitance, theoricalCapacitance[5 # / 6000] &] * 100]

plot = Show[
   Plot[theoricalCapacitance[5 V / 6000], {V, 0, 118}],
   AxesLabel → {"Volume (mL)", "Capacitância (pF)"},
   PlotLabel → "Capacitância", ImageSize → Full
  ];
Export[NotebookDirectory[] <> "/Images/Nivel/Teorico/Capacitancia.pdf", plot];

plot = Show[
   Plot[theoricalCapacitance[5 V / 6000], {V, 0, 118}],
    ListPlot[capacitance], PlotRange → {0, 400},
   AxesLabel → {"Volume (mL)", "Capacitância (pF)"},
   PlotLabel → "Comparação entre capacitância téorica e experimental",
   ImageSize → Full
  ];
Export[NotebookDirectory[] <>
   "/Images/Nivel/Experimental/Capacitancia-Comparacao.pdf", plot];
```

Out[1873]=
$$\frac{(700.035\,h + 8.85\,H)\,\text{EllipticK}\left[\sqrt{1 - \frac{d^4}{16\,(d+w)^4}}\right]}{\text{EllipticK}\left[\frac{1}{2}\sqrt{\frac{d^2}{(d+w)^2}}\right]}$$

Out[1875]=
```
{3.41655, 36.7807, 53.4627, 70.1448,
 86.8268, 103.509, 120.191, 136.873, 153.555, 170.237}
```

Out[1876]= $3.41655 + 1.66821\,V$

Out[1877]= 1.66821

Out[1878]= 3.41655 + 2001.85 h

Out[1879]= 2.00185

Erro de Linearidade = 24.6777

In[1862]:=
```
theoreticalTime[h_] =
  2 R Ca Log[(1 + λ)/(1 - λ)] * 16 000 000 /. {Ca → (theoricalCapacitance[h] + 27) 10^-12,
    λ → 10 000/(10 000 + 10 000), R → (2 200 000 + 6 000 000)};
FullSimplify[theoreticalTime[h]]
D[theoreticalTime[h / 1000], h]

FullSimplify[theoreticalTime[5 V / 6000]]
D[theoreticalTime[5 V / 6000], V]

Print["Erro de Linearidade = ",
 FindIdealityError[time, theoreticalTime[5 # / 6000] &] * 100]

plot = Show[
   Plot[theoreticalTime[5 V / 6000], {V, 0, 118}],
   AxesLabel → {"Volume (mL)", "Ciclos"},
   PlotLabel → "Ciclos", ImageSize → Full
  ];
Export[NotebookDirectory[] <> "/Images/Nivel/Teorico/Ciclos.pdf", plot];

plot = Show[
   Plot[theoreticalTime[5 V / 6000], {V, 2, 118}],
    ListPlot[time], PlotRange → {0, 100 000},
   AxesLabel → {"Volume (mL)", "Ciclos"},
   PlotLabel → "Comparação entre número de ciclos téorico e experimental",
   ImageSize → Full
  ];
Export[
  NotebookDirectory[] <> "/Images/Nivel/Experimental/Ciclos-Comparacao.pdf", plot];
```

Out[1863]= 8768.36 + 577 084. h

Out[1864]= 577.084

Out[1865]= 8768.36 + 480.903 V

Out[1866]= 480.903

Erro de Linearidade = 14.0372

In[1851]:=
```
theoreticalFrequency[h_] =
   1/(2 R Ca Log[(1+λ)/(1-λ)]) /. {Ca → (theoricalCapacitance[h] + 27) 10^-12,
     λ → 10 000/(10 000 + 10 000), R → (2 200 000 + 6 000 000)};
FullSimplify[theoreticalFrequency[h]]
FullSimplify[theoreticalFrequency[5 V / 6000]]
sens = FullSimplify[D[theoreticalFrequency[5 V / 6000], V]]

Print["Erro de Linearidade = ",
 FindIdealityError[frequency, theoreticalFrequency[5 # / 6000] &] * 100]

plot = Show[
    Plot[theoreticalFrequency[5 V / 6000], {V, 0, 118}],
    AxesLabel → {"Volume (mL)", "Frequência (Hz)"},
    PlotLabel → "Frequência", ImageSize → Full
   ];
Export[NotebookDirectory[] <> "/Images/Nivel/Teorico/Frequencia.pdf", plot];

plot = Show[
    Plot[sens, {V, 0, 118}],
    AxesLabel → {"Volume (mL)", "Frequência/Volume (Hz/mL)"},
    PlotLabel → "Frequência - Sensibilidade", ImageSize → Full
   ];
Export[NotebookDirectory[] <>
    "/Images/Nivel/Teorico/Frequencia-Sensibilidade.pdf", plot];


plot = Show[
    Plot[theoreticalFrequency[5 V / 6000], {V, 2, 118}],
     ListPlot[frequency],
    AxesLabel → {"Volume (mL)", "Frequência (Hz)"},
    PlotLabel → "Comparação entre frequência téorica e experimental",
    ImageSize → Full
   ];
Export[NotebookDirectory[] <>
    "/Images/Nivel/Experimental/Frequencia-Comparacao.pdf", plot];
```

Out[1852]=
$$\frac{27.7256}{0.0151942 + 1.\,h}$$

Out[1853]=
$$\frac{33\,270.7}{18.2331 + 1.\,V}$$

Out[1854]=
$$-\frac{33\,270.7}{(18.2331 + 1.\,V)^2}$$

```
Erro de Linearidade = 368.635
```

In[1838]:=
```
theoreticalCompensated[h_] = (Ca - Ca0)/(CR - Ce) /. {Ca → (theoricalCapacitance[h] + 27) 10^-12,
    Ca0 → (theoricalCapacitance[0] + 27) 10^-12, CR -> CoplanarStripsCapacitance[
       80.1 × 8.85 × 10^-12, 270 / 1000, 14 / 1000, 18 / 1000 ] + (27) 10^-12,
    Ce -> CoplanarStripsCapacitance[8.85 × 10^-12, 27 / 1000,
```

```
        14 / 1000, 18 / 1000 ] + (27) 10^-12};
FullSimplify[theoreticalCompensated[h]]
FullSimplify[theoreticalCompensated[5 V / 6000]]
FullSimplify[D[theoreticalCompensated[5 V / 6000], V]]

Print["Erro de Linearidade = ",
 FindIdealityError[compensated, theoreticalCompensated[5 # / 6000] &] * 100]

plot = Show[
   Plot[theoreticalCompensated[5 V / 6000], {V, 0, 118}],
   AxesLabel → {"Volume (mL)", "Valor N (Compensado)"},
   PlotLabel → "Valor N (Compensado)", ImageSize → Full
  ];
Export[NotebookDirectory[] <> "/Images/Nivel/Teorico/Compensado.pdf", plot];

plot = Show[
   Plot[theoreticalCompensated[5 V / 6000], {V, 0, 118}],
    ListPlot[compensated],
   AxesLabel → {"Volume (mL)", "Valor N"},
   PlotLabel → "Comparação entre o valor N compensado téorico e experimental",
   ImageSize → Full
  ];
Export[NotebookDirectory[] <>
   "/Images/Nivel/Experimental/Compensado-Comparacao.pdf", plot];

theoreticalCompensatedForTime = V /. Solve[
     compensatedModel[V] == (2 R Ca Log[(1 + R1/(R1+R2))/(1 - R1/(R1+R2))] * Clk - 2 R Ca0 Log[(1 + R1/(R1+R2))/(1 - R1/(R1+R2))] * Clk) / (2 R CR Log[(1 + R1/(R1+R2))/(1 - R1/(R1+R2))] * Clk - 2 R Ce Log[(1 + R1/(R1+R2))/(1 - R1/(R1+R2))] * Clk), V][[1]];

theoreticalCompensatedForTime = V /. Solve[compensatedModel[V] == (T - T0)/(TR - TRE), V][[1]];
Sqrt[Total[
   {
    Power[D[theoreticalCompensatedForTime, T] * 0.03, 2],
    Power[D[theoreticalCompensatedForTime, T0] * 0.03, 2],
    Power[D[theoreticalCompensatedForTime, TR] * 0.03, 2],
    Power[D[theoreticalCompensatedForTime, TRE] * 0.03, 2]
   }
  ]
 ] // FullSimplify

((PlusMinus[Abs[theoreticalCompensatedForTime],
       Abs[theoreticalCompensatedForTime * Sqrt[Total[
            {
             Power[D[theoreticalCompensatedForTime, T] * 0.03, 2],
             Power[D[theoreticalCompensatedForTime, T0] * 0.03, 2],
             Power[D[theoreticalCompensatedForTime, TR] * 0.03, 2],
             Power[D[theoreticalCompensatedForTime, TRE] * 0.03, 2]
            }
           ]
          ]]]) /. {T → #, T0 → time[[All, 2]][[1]], TR -> 69 099, TRE → 26 668}) & /@
```

Out[1839]= 0. + 3.66204 h

Out[1840]= 0. + 0.0030517 V

Out[1841]= 0.0030517

Erro de Linearidade = 66.8604

Solve::ratnz : Solve was unable to solve the system with inexact coefficients.
The answer was obtained by solving a corresponding exact system and numericizing the result. >>

Solve::ratnz : Solve was unable to solve the system with inexact coefficients.
The answer was obtained by solving a corresponding exact system and numericizing the result. >>

Out[1849]= $$\sqrt{\left(\left(1.0149\times10^{35}\,T^2-2.0298\times10^{35}\,T\,T0+1.0149\times10^{35}\,T0^2+1.0149\times10^{35}\,TR^2-2.0298\times10^{35}\,TR\,TRE+1.0149\times10^{35}\,TRE^2\right)\Big/\left(\left(-3.34809\times10^{33}\,T+3.34809\times10^{33}\,T0+4.99818\times10^{33}\,TR-4.99818\times10^{33}\,TRE\right)(TR-1.\,TRE)^3\right)\right)}$$

Out[1850]= {14.4591 ± 0.00153555, 8.51131 ± 0.00092259, 0.191943 ± 0.0000215648,
4.11195 ± 0.000470485, 5.90943 ± 0.00068211, 2.74841 ± 0.000312437,
3.41083 ± 0.000388957, 20.2416 ± 0.00211433, 5.95491 ± 0.000687514,
8.25663 ± 0.00096438, 8.61815 ± 0.00100848, 11.1505 ± 0.00132224, 12.0232 ± 0.00143241,
13.0629 ± 0.00156509, 14.1614 ± 0.00170698, 15.0432 ± 0.00182219, 15.9001 ± 0.00193527,
17.0651 ± 0.00209086, 21.5473 ± 0.00271018, 23.8155 ± 0.00303679, 24.728 ± 0.00317081,
23.6594 ± 0.00301401, 24.6692 ± 0.00316214, 25.0195 ± 0.00321396,
25.7042 ± 0.00331592, 26.7497 ± 0.00347332, 27.7872 ± 0.00363161,
30.1395 ± 0.00399838, 35.7635 ± 0.004922, 38.6854 ± 0.00542942, 38.9256 ± 0.00547201,
39.0363 ± 0.00549169, 41.3657 ± 0.00591246, 43.455 ± 0.00630108, 45.7147 ± 0.00673374,
46.247 ± 0.00683758, 47.6681 ± 0.0071184, 51.5516 ± 0.00791356, 50.212 ± 0.00763459,
51.9652 ± 0.00800069, 51.7448 ± 0.0079542, 55.1079 ± 0.00867874, 55.5472 ± 0.00877579,
57.0199 ± 0.00910537, 59.9964 ± 0.0097915, 62.243 ± 0.0103277, 63.5468 ± 0.0106463,
64.8827 ± 0.0109785, 67.5494 ± 0.0116594, 69.1717 ± 0.0120855, 74.5478 ± 0.0135648,
77.1975 ± 0.0143332, 77.5745 ± 0.0144448, 77.8223 ± 0.0145184, 86.7765 ± 0.0173448,
86.4786 ± 0.0172453, 84.6922 ± 0.016657, 88.8576 ± 0.0180503, 91.9344 ± 0.0191292,
88.5708 ± 0.0179519, 93.2568 ± 0.0196064, 97.4648 ± 0.0211805, 99.9123 ± 0.0221365,
99.8403 ± 0.0221079, 100.62 ± 0.0224187, 102.936 ± 0.0233604, 104.2 ± 0.0238866,
105.684 ± 0.0245154, 107.748 ± 0.0254102, 113.366 ± 0.0279727, 119.874 ± 0.031187,
118.361 ± 0.030415, 118.421 ± 0.0304454, 124.632 ± 0.0337185, 127.694 ± 0.0354346,
134.941 ± 0.0397888, 145.117 ± 0.0466815, 144.624 ± 0.0463239, 150.584 ± 0.0508102,
160.966 ± 0.0596108, 163.784 ± 0.062244, 168.058 ± 0.0664595, 172.257 ± 0.0708839,
180.242 ± 0.0801702, 176.08 ± 0.0751784, 181.204 ± 0.0813748, 186.409 ± 0.0882424,
189.029 ± 0.0919422, 195.704 ± 0.102202, 207.467 ± 0.12381, 207.805 ± 0.124511,
214.557 ± 0.139623, 230.678 ± 0.187097, 226.516 ± 0.172931, 233.102 ± 0.196123,
245.022 ± 0.251437, 263.555 ± 0.403629, 277.183 ± 0.655596, 293.975 ± 2.0487,
304.117 ± 0.621362, 313.246 ± 0.245286, 314.654 ± 0.232586, 317.091 ± 0.21547,
320.454 ± 0.198365, 321.306 ± 0.194859, 318.979 ± 0.205144, 325.224 ± 0.181718,
326.869 ± 0.177318, 329.215 ± 0.171898, 330.021 ± 0.170234, 332.088 ± 0.166352,
334.568 ± 0.162327, 337.609 ± 0.158162, 339.798 ± 0.155595, 341.618 ± 0.153692,
342.965 ± 0.152405, 345.61 ± 0.15014, 345.608 ± 0.150142, 348.05 ± 0.148324}

```
k1 k2 /. {k1 → d/(2 (w1 + d)), k2 → d/(2 (w2 + d))}
Sqrt[k1 k2] /. {k1 → d/(2 (w1 + d)), k2 → d/(2 (w2 + d))}

Solve[V * 1000 == 60 * 20 * h, h]
```

$$\frac{d^2}{4\,(d+w1)\,(d+w2)}$$

$$\frac{1}{2}\sqrt{\frac{d^2}{(d+w1)\,(d+w2)}}$$

$$\left\{\left\{h \to \frac{5\,V}{6}\right\}\right\}$$

In[1926]:=
```
Export[NotebookFileName[] <> ".pdf", EvaluationNotebook[]];
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