\[\]
\[
\text{\texttt{\texttt{\texttt{\texttt{n} := 30 \quad i := 1 \ldots n}}}}
\]
\[
\text{\texttt{\texttt{\texttt{T} := \{} \text{\texttt{\texttt{\texttt{C} := \{} \text{\texttt{\texttt{\texttt{\texttt{i}} := 1 \ldots n}}}}}}}}
\]
\[
\begin{array}{ll}
1 & 0.000818 \\
3 & 0.0065 \\
5 & 0.0243 \\
8 & 0.0927 \\
10 & 0.183 \\
15 & 0.670 \\
20 & 1.647 \\
25 & 3.066 \\
30 & 4.774 \\
35 & 6.612 \\
40 & 8.419 \\
45 & 10.11 \\
50 & 11.66 \\
55 & 13.04 \\
60 & 14.27 \\
65 & 15.35 \\
70 & 16.30 \\
80 & 17.87 \\
90 & 19.11 \\
100 & 20.10 \\
120 & 21.54 \\
140 & 22.52
\end{array}
\]
The heat capacity data were taken from the *Handbook of Physics and Chemistry* - 72nd Edition, page 5-71. The data are presented in units of Joules/mole/K.

Gas law constant:

\[
\text{R} := 8.3145
\]

Define Einstein function for heat capacity:

\[
\text{F}(T, \Theta) := 3 \cdot \text{R} \cdot \left(\frac{\Theta}{T}\right)^2 \cdot \frac{\exp \left(\frac{\Theta}{T}\right)}{\left(\exp \left(\frac{\Theta}{T}\right) - 1\right)^2}
\quad \text{where} \quad \Theta = \frac{h \cdot v}{k}
\]

Form the sum of the squares of the deviations:

\[
\text{SSD}(\Theta) := \sum_{i} \left( C_i - \text{F}(T_i, \Theta) \right)^2
\]

Minimize the sum of the squares of the deviations:

\[
\Theta := 200
\]
Given

\[ \text{SSD}(\Theta) = 0 \quad \Theta = \text{Minerr}(\Theta) \]

Einstein Temperature for best fit:

\[ \Theta = 154.707 \]

Mean squared error:

\[ \frac{\text{SSD}(\Theta)}{(n-2)} = 0.319 \]

Plot data and fit:

\[ t := 1 \quad \text{dots} \quad 300 \]