Sublimation of Dry Ice

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Worksheet to start analysis of dry ice model in Section 3.5.1.

> $with(plots):$

The data, in time (seconds)/mass (grams) pairs.

> $data := [[0., 25.525], [120.0, 24.512], [240.0, 23.524], [360.0, 22.639], [480.0, 21.765], [600.0, 20.89], [720.0, 20.043], [840.0, 19.221], [960.0, 18.431], [1080.0, 17.677], [1200.0, 16.936], [1320.0, 16.22], [1440.0, 15.548], [1570.0, 14.828], [1680.0, 14.213], [1800.0, 13.553], [1930.0, 12.91], [2040.0, 12.331], [2170.0, 11.689], [2280.0, 11.188], [2410.0, 10.566], [2530.0, 10.043], [2690.0, 9.377], [2780.0, 9.011], [2880.0, 8.616], [3060.0, 7.945], [3220.0, 7.404], [3380.0, 6.877], [3480.0, 6.593], [3600.0, 6.244]]:$

Number of data points is

> $N := nops(data)$

A plot of the data

> $pointplot(data, labels = [\text{"time (seconds)"}, \text{"mass (grams)"}], labeldirections = [horizontal, vertical], view = [0..3600, 0..30], symbol = solidcircle, color = red, symbolsize = 15)$

A linear model (bad) of the form u(t) = b - m*t can be fit as follows:

> $u(m, b, t) := b - m \cdot t:$
$SS := add\left((u(m, b, data[j][1]) - data[j][2])^2, j = 1..N\right):$

Then minimize SS with respect to m and b.

Redo with your own (better/physically motivated) model for u(t)!