

INTRODUCTION TO MATHEMATICAL MODELLING

LECTURE 3: SCALING II

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Homework: Compute the constants in Bender's packaging model [1, §2.1] that we discussed in the lecture on W 11 January:

$$\frac{\text{cost}}{w} = n + \frac{p}{w^{1/3}} + \frac{q}{w},$$

for his flour data:

pounds	US\$
2	0.27
5	0.39
10	0.85

Estimate the constants for his milk data:

quarts	US\$
3	0.49
8	1.09
14	1.59
20	2.19

Hint: Use the method of least squares on the milk data. Both the Wikipedia [2] and MathWorld [3] are fairly reliable on mathematical topics; each has an entry for "least squares". Jake will also discuss this next week.

References

- [1] E. A. Bender, *An Introduction to Mathematical Modeling* (Mineola, NY: Dover 2000).
- [2] Wikipedia, “Least squares”,
http://en.wikipedia.org/wiki/Method_of_least_squares.
- [3] E. W. Weisstein, “Least squares fitting”, from MathWorld—A Wolfram Web Resource,
<http://mathworld.wolfram.com/LeastSquaresFitting.html>.