

ASE-4040 Exercise Set 7 (Visualising data)

Problem 1

In 1879, A. A. Michelson made 20 measurements of the speed of light in a vacuum. The measured values are $(x_i + 299\,000)$ km/s, where x_i values are

850 900 930 950 980 1000 930 760 1000 960
740 1070 850 980 880 980 650 810 1000 960

- Make a frequency table with bin edges 600, 700, ..., 1100. Check your answer with MATLAB.
- What are the default bins that `histogram` uses for this data? What distribution features does the histogram show?
- Draw an empirical CDF with MATLAB. Use it to find the “mathematical” quartiles.
- Find the quartiles using MATLAB. Are there any outliers (i.e. points outside the range $[q_1 - 1.5 \text{ IQR}, q_3 + 1.5 \text{ IQR}]$)?
- In 1882, with new apparatus, Michelson made the following measurements:

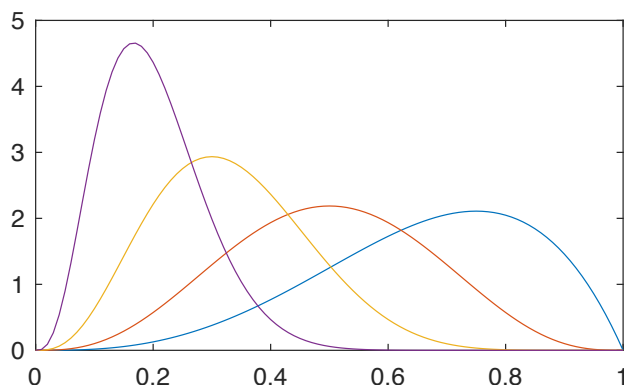
883 778 682 611 1051 578 774 772 573 748 851 723
816 796 711 599 781 796 820 696 748 797 809

Make a figure with box plots of Michelson’s two data sets on the same axes. What does the figure tell about the data?

Problem 2

Edit this plot to make it suitable for a scientific publication or technical report. Describe the changes that you make.

```
a=[4 4 4 4]; b=[2 4 8 16];  
x=0:.01:1;  
clear p  
for k=1:length(a)  
    p(k,:)=betapdf(x,a(k),b(k));  
end  
plot(x,p)
```



Answers 1. (c) $q_1 = 850$, $q_2 = [930, 950)$, $q_3 = 980$ (d) yes