Bike Frequency

i krysset mellom Elgeseter bru og Studentersamfundet

Observert fra en kafé med utsikt mot mesteparten av krysset, bortsett fra svingen i motsatt retning av Samfundet

Initialization and Display of Raw Data

Reading from `freqs.csv` into time and bike arrays

```
A = textscan(fopen("freqs.csv"), '%s %d', 'Delimiter',',');
time = A{1};
bikes = A{2};
if size(bikes) ~= size(time)
    disp('oh snap, invalid sizes')
end
```

Finding total and accumulating count of bikes

```
total = sum(bikes);
disp(strcat('In total, ', string(total), ...
    ' bikes passed during 30 minutes'))
```

```
In total,78 bikes passed during 30 minutes
```

```
disp(strcat('That means =', string(total / 30), ...
    ' bikes pass on average every minute'))
```

```
That means =2.6 bikes pass on average every minute
```

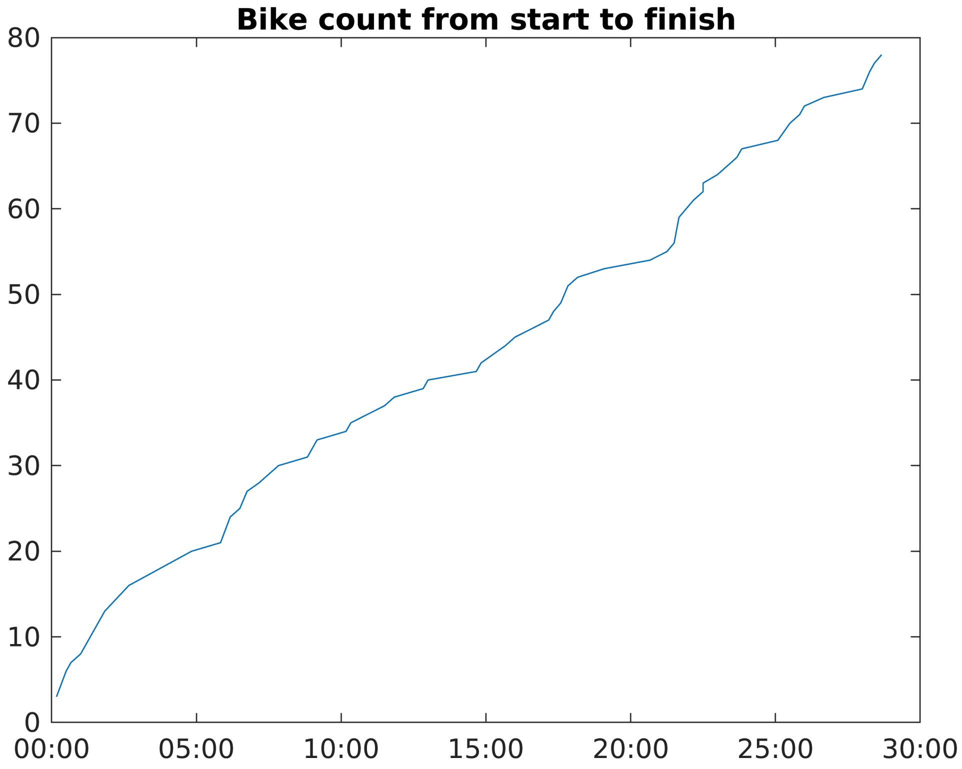
```
bikes = cumsum(bikes);
```

Converting strings to `MATLAB` timestamps

```
time = datetime(time, 'Format','mm:ss');
```

Plotting a graph

```
plot(datenum(time), bikes)
title('Bike count from start to finish')
datetick('x', 'MM:SS')
```



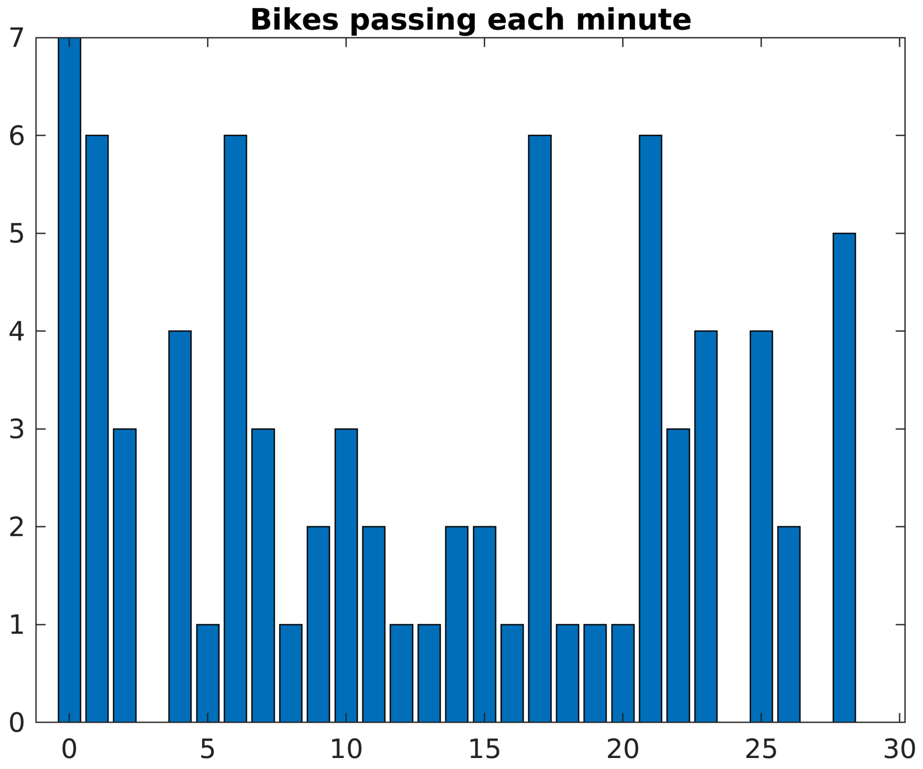
A: Sentralmål og variasjon - split into counts for each minute

Reading reformatted data, split by 0-indexed minutes

```
B = textscan(fopen("minutes.csv"), '%d %d', 'Delimiter',',');
minute = B{1};
minute_bikes = B{2};
if sum(minute_bikes) ~= total
    disp('wrong count of bikes divided by minute')
elseif size(minute) ~= size(zeros(30, 1))
    disp('you forgot a minute')
    disp(size(minute))
end
```

Plotting columns

```
bar(minute, minute_bikes)
title('Bikes passing each minute')
```



Sentralmål

```
sprintf('%.2f bikes passed on average', mean(minute_bikes))
```

```
ans =
'2.60 bikes passed on average'
```

```
% sorted_bikes = sort(minute_bikes);
% Not necessary to sort since median() sorts for us
sprintf('Median: %d', median(minute_bikes))
```

```
ans =
'Median: 2'
```

```
sprintf('Mode (typetall): %d', mode(minute_bikes))
```

```
ans =
'Mode (typetall): 1'
```

Variasjonsbredde og standardavvik

```
sprintf('Range (variasjonsbredde): %d', range(minute_bikes))
```

```
ans =
'Range (variasjonsbredde): 7'
```

```
% Also possible: max(minute_bikes) - min(minute_bikes)
sprintf('Standard deviation (standardavvik): %f', std(double(minute_bikes)))
```

```
ans =
'Standard deviation (standardavvik): 2.094327'
```

B: Poisson Distribution, Estimates

Calculating Lambda

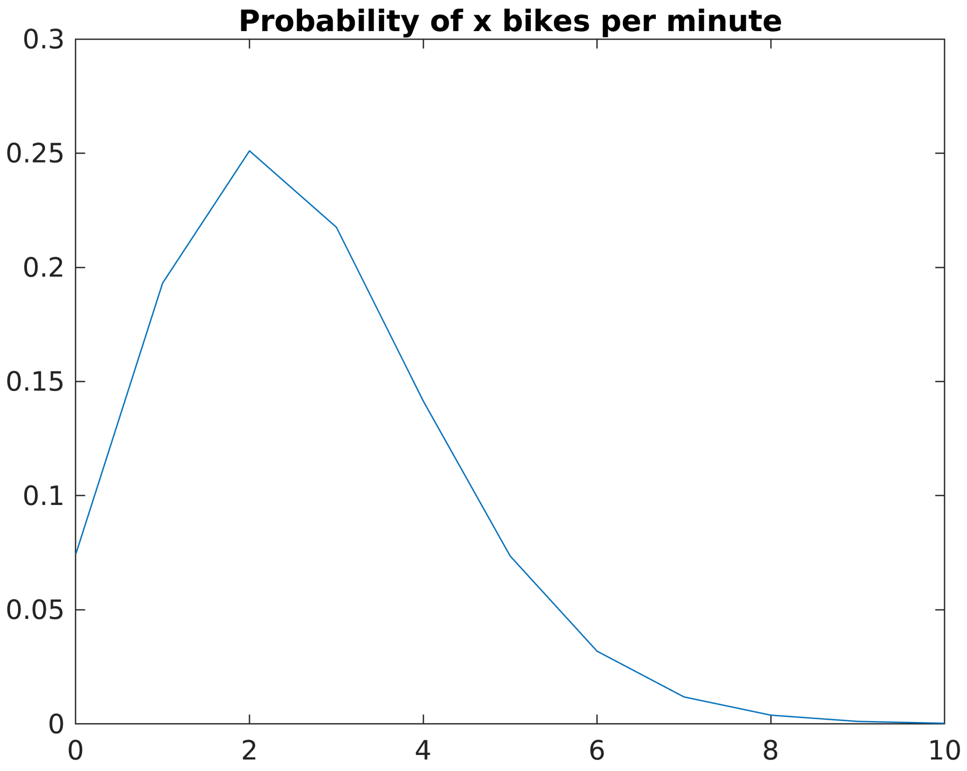
$$\hat{\lambda} = \frac{x}{t}$$

```
lambda = total / 30;
```

With t = 1 minute

– lower reliability

```
x = 0:10;
plot(x, poisspdf(x,lambda))
title('Probability of x bikes per minute')
```

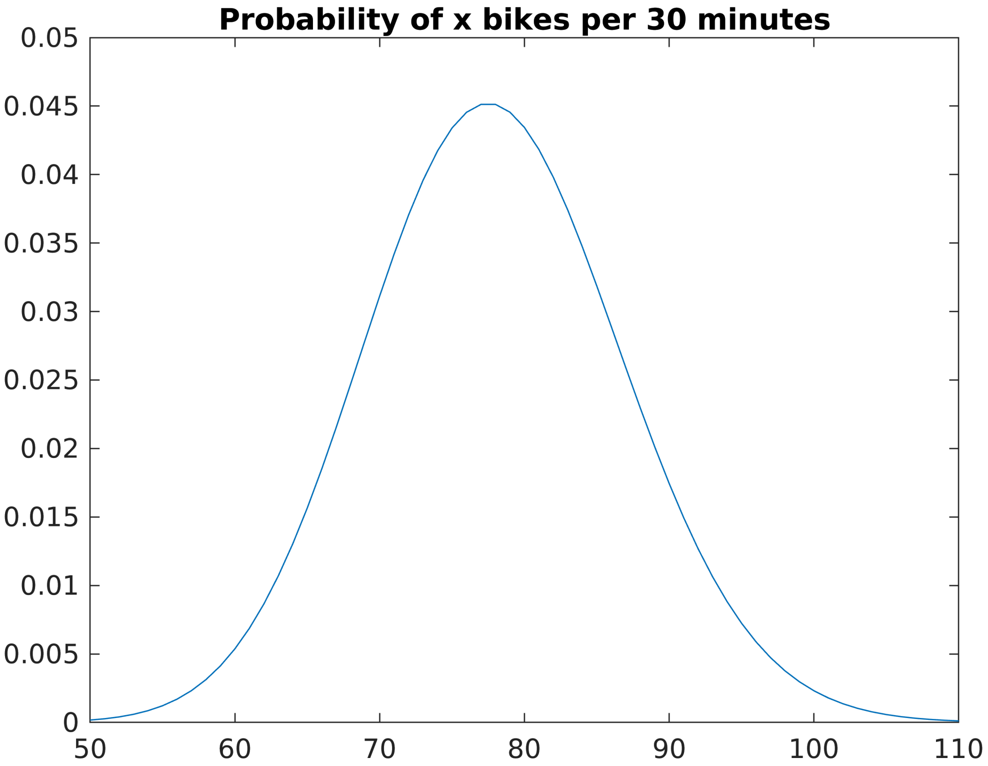


With t = 30 minutes

– which matches the circumstances of our original data

$$\hat{\lambda} \cdot t = \frac{x}{t} \cdot t = x$$

```
x = 50:110;
plot(x, poisspdf(x,total))
title('Probability of x bikes per 30 minutes')
```


Probability of x bikes per 30 minutes
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
50
60
70
80
90
100
110