Advanced Statistics HW1

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Exercises 1

Let Y be a normal distributed random variable, μ is the mean, and σ is the standard deviation. What is the probability density function of Y?

Answer:

Denote $Y \sim N(\mu, \sigma^2)$, then the pdf of Y is

$$f(y|\mu,\sigma) = \frac{1}{\sqrt{2\pi\sigma^2}}\exp\left(-\frac{(y-\mu)^2}{2\sigma^2}\right)$$

Exercises 2.

Display the dataset `mpg` with `kable`.

Answer:

The table of dataset `mpg` with `kable` can be given as below:

```
knitr::kable(head(mpg),
   caption = 'Table of the first several data', booktabs = TRUE)
```

Table 1: Table of the first several data

manufacturer	model	displ	year	cyl	trans	drv	cty	hwy	fl	class
audi	a4	1.8	1999	4	auto(l5)	f	18	29	p	compact
audi	a4	1.8	1999	4	manual(m5)	f	21	29	p	compact
audi	a4	2.0	2008	4	manual(m6)	f	20	31	p	compact
audi	a4	2.0	2008	4	auto(av)	f	21	30	p	compact
audi	a4	2.8	1999	6	auto(l5)	f	16	26	p	compact
audi	a4	2.8	1999	6	manual(m5)	f	18	26	p	compact

Exercises 3

Plot the `hwy` against `displ` in dateset `mpg`.

Answer:

The code and figure are given as follows

```
ggplot(data = mpg) +
    geom_point(mapping = aes(x = displ, y = hwy))
```

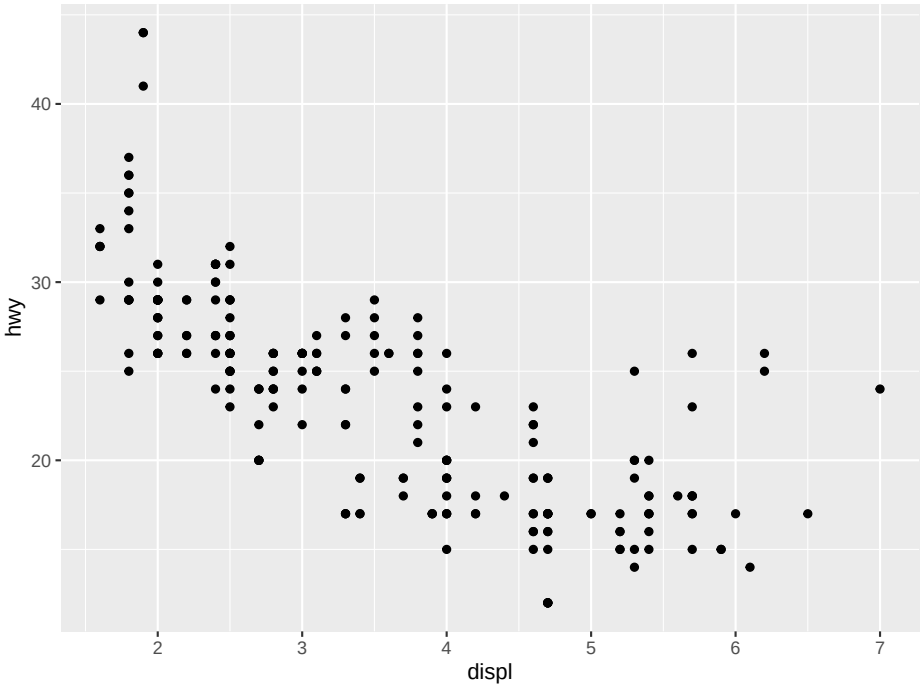

Figure 1: ggplot of hwy vs displ