

Extended Sweave Example

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1 Analysis & Results

The `mtcars` ('Motor Trend Car Road Tests') data set is comprised of 11 aspects of automobile design and performance (columns) for 32 automobiles (rows). We wish to know if there is a significant difference in the quarter mile track times (`qsec`) between the different cylinder classes (`cyl`; 4, 6, and 8).

Let's first examine the quantiles (minimum, first quantile, median, and third quantile) of the times within each cylinder class. These values are given in Table 1.

Table 1: Quantiles of the quarter mile track times within each cylinder class

N.cylinders	Min	Q1	Median	Q3	Max
4.00	16.70	18.56	18.90	19.95	22.90
6.00	15.50	16.74	18.30	19.17	20.22
8.00	14.50	16.10	17.18	17.55	18.00

Based on a non-parametric Kruskal-Wallis test, we see that the times are significantly different from each other:

```
> with(mtcars, kruskal.test(qsec ~ cyl))
```

```
Kruskal-Wallis rank sum test
```

```
data: qsec by cyl
```

```
Kruskal-Wallis chi-squared = 10.1552, df = 2, p-value = 0.006235
```

Lastly, Figure 1 graphically displays the distribution of the times within each cylinder class – the raw values (shown using a 'stripchart') are overlaid with side-by-side boxplots. The width of each box is also proportional to the number of cars within each cylinder group – 34.4% (11) 4 cylinder cars; 21.9% (7) 6 cylinder cars; and 43.8% (14) 8 cylinder cars.

Figure 1: Distribution of 1/4 mile track time (sec) within each cylinder class.

