# Model comparison

Francisco Rodríguez-Sánchez

https://frodriguezsanchez.net

# Trees dataset

```
trees <- read.csv("data/trees.csv")
head(trees)
```

```
  site   dbh height    sex dead
1    4 29.68   36.1   male    0
2    5 33.29   42.3   male    0
3    2 28.03   41.9 female    0
4    5 39.86   46.5 female    0
5    1 47.94   43.9 female    0
6    1 10.82   26.2   male    0
```

# Four models

```
m1 <- lm(height ~ dbh, data = trees)
```

```
m2 <- lm(height ~ sex, data = trees)
```

```
m3 <- lm(height ~ site, data = trees)
```

```
m4 <- lm(height ~ site*dbh, data = trees)
```

# Compare model performance

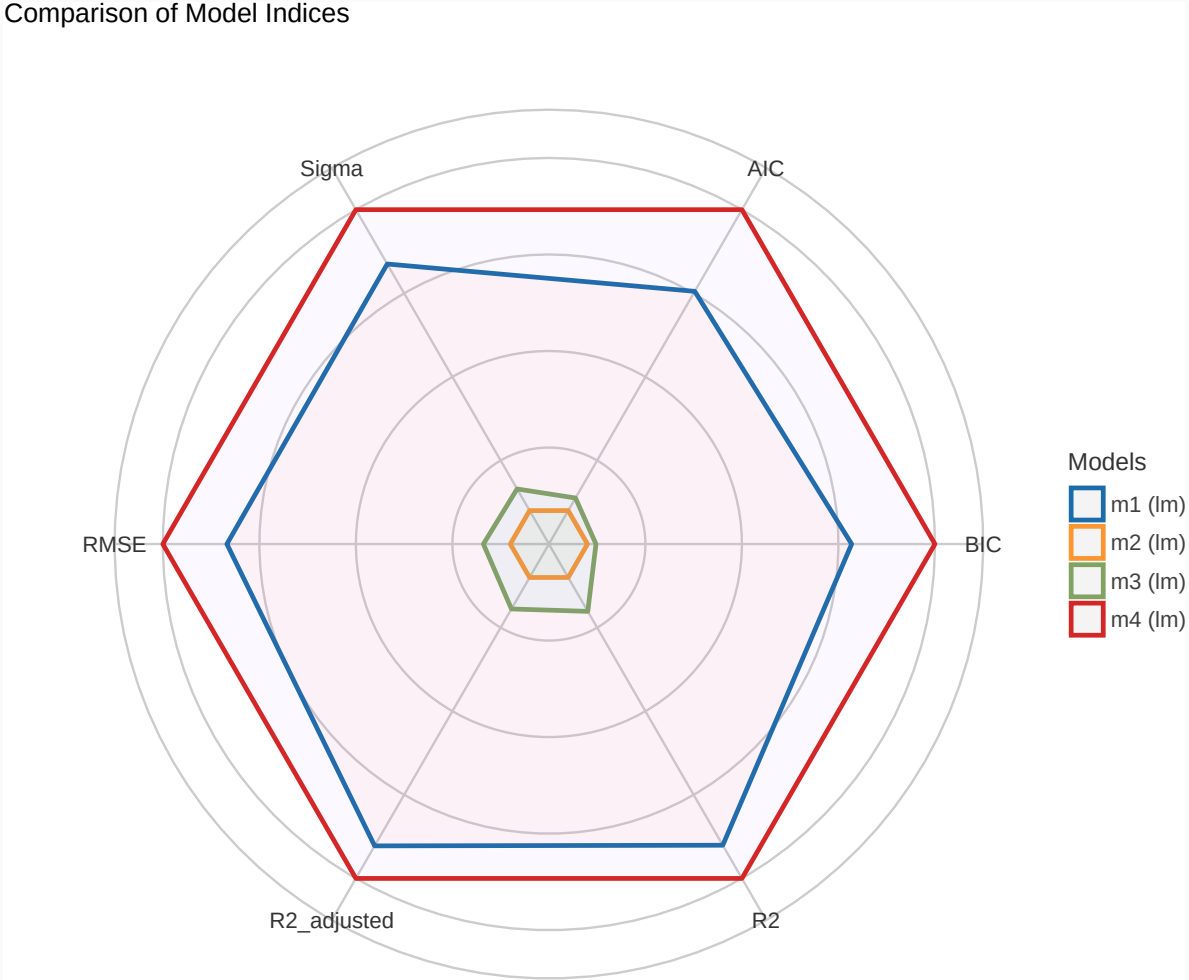
```
library("performance")
compare_performance(m1, m2, m3, m4)
```

```
# Comparison of Model Performance Indices

Name | Model |      AIC |      BIC |    R2 | R2 (adj.) |  RMSE | Sigma
-----------------------------------------------------------------------
m1   |    lm | 5660.250 | 5674.973 | 0.787 |     0.787 | 4.089 | 4.093
m2   |    lm | 7206.145 | 7220.868 | 0.002 |     0.001 | 8.856 | 8.865
m3   |    lm | 7117.264 | 7171.250 | 0.102 |     0.093 | 8.404 | 8.446
m4   |    lm | 5084.253 | 5187.316 | 0.885 |     0.882 | 3.011 | 3.041
```

# Compare model performance

```
library("see")
plot(compare_performance(m1, m2, m3, m4))
```



# Compare parameters

```
library("parameters")
compare_parameters(m1, m2, m3, m4)
```

| Parameter | m1 | m2 | m3 | m4 |
|---|---|---|---|---|
| (Intercept) | 19.34 (18.73, 19.95) | 36.93 (36.15, 37.71) | 33.84 (33.00, 34.68) | 16.36 ( 15.65, 17.07) |
| dbh | 0.62 ( 0.60, 0.64) | | | 0.63 ( 0.61, 0.65) |
| sex (male) | | -0.84 (-1.94, 0.26) | | |
| site (5) | | | 4.37 ( 2.52, 6.22) | 3.92 ( 2.21, 5.63) |
| site (2) | | | 6.34 ( 4.94, 7.74) | 7.68 ( 6.49, 8.88) |
| site (3) | | | 5.00 ( 3.07, 6.93) | 4.52 ( 2.82, 6.22) |
| site (4) | | | 0.53 (-1.40, 2.47) | 2.77 ( 1.17, 4.37) |
| site (9) | | | 9.17 ( 3.25, 15.09) | 2.62 ( -7.34, 12.58) |
| site (6) | | | 4.76 ( 2.46, 7.06) | 4.16 ( 2.17, 6.14) |
| site (7) | | | -0.74 (-4.37, 2.89) | -2.31 ( -5.35, 0.74) |
| site (8) | | | -0.68 (-5.54, 4.17) | -2.62 (-10.64, 5.41) |
| site (10) | | | -0.58 (-8.04, 6.88) | 4.66 ( -1.21, 10.53) |
| site (3) * dbh | | | | -6.03e-03 ( -0.06, 0.05) |
| site (4) * dbh | | | | -0.03 ( -0.09, 0.02) |
| site (5) * dbh | | | | -0.01 ( -0.06, 0.04) |
| site (2) * dbh | | | | -0.04 ( -0.08, 0.00) |
| site (7) * dbh | | | | 0.08 ( -0.02, 0.18) |
| site (8) * dbh | | | | -0.08 ( -0.30, 0.14) |
| site (9) * dbh | | | | 0.08 ( -0.21, 0.37) |
| site (6) * dbh | | | | 1.34e-03 ( -0.06, 0.06) |
| site (10) * dbh | | | | -0.10 ( -0.33, 0.12) |
| Observations | 1000 | 1000 | 1000 | 1000 |

# Compare parameters

```
library("parameters")
plot(compare_parameters(m1, m2, m3, m4))
```