

# Polynomial Regression Models

## Example: Wage (ISLR2)

```
Analysis of Variance Table

Model 1: wage ~ poly(age, 1)
Model 2: wage ~ poly(age, 2)
Model 3: wage ~ poly(age, 3)
Model 4: wage ~ poly(age, 4)
Model 5: wage ~ poly(age, 5)
  Res.Df  RSS Df Sum of Sq    F    Pr(>F)
1    2998 5022216
2    2997 4793430  1    228786 143.5931 < 2.2e-16 ***
3    2996 4777674  1    15756   9.8888 0.001679 **
4    2995 4771604  1     6070   3.8098 0.051046 .
5    2994 4770322  1     1283   0.8050 0.369682
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

### ANOVA

sequential comparisons based on the F-test

For each step:

$H_0$  = the decrease in RSS is not significant

If hypothesis is rejected we move on to next comparison

# Step Functions