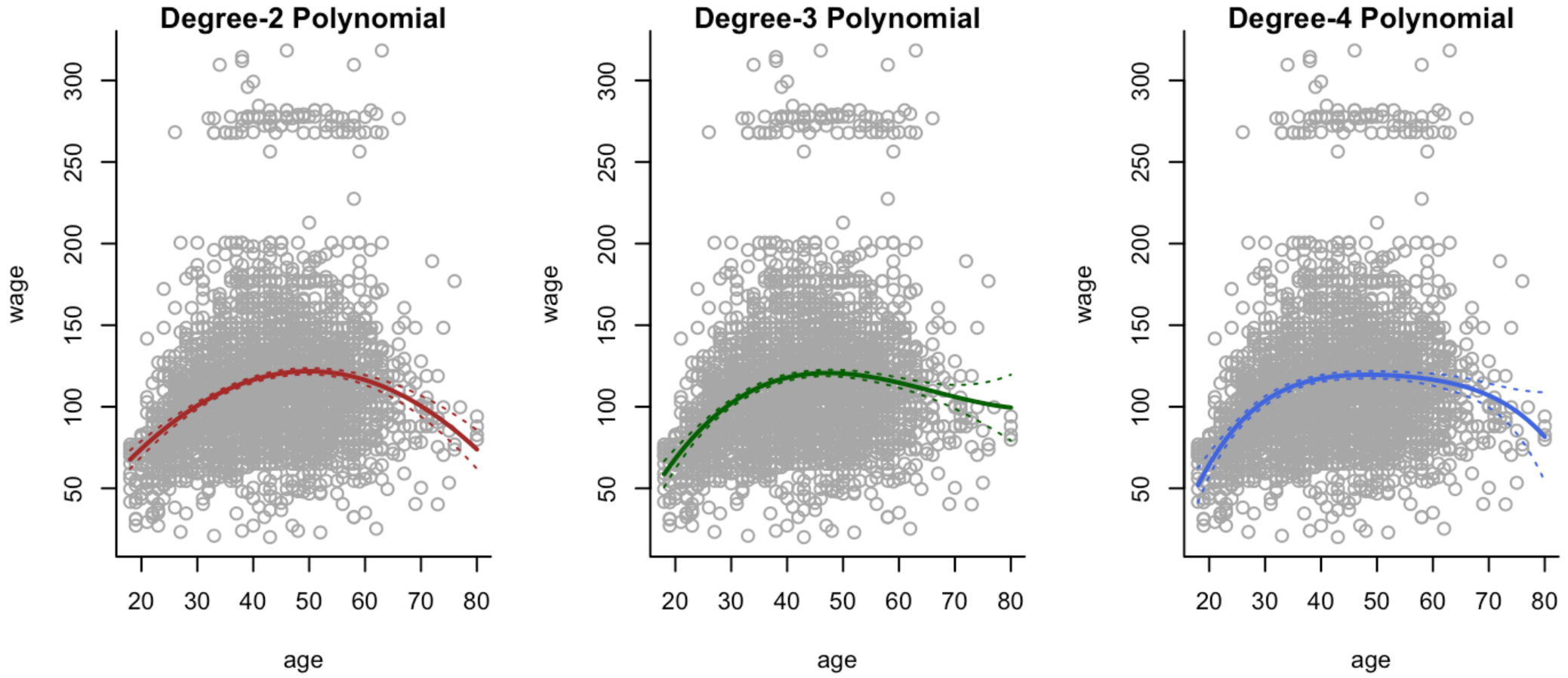
Polynomial Regression Models

Example: Wage (ISLR2)



95% confidence interval for the mean prediction at x:

$\hat{f}(x) \pm 2 \times \text{SE}[\hat{f}(x)]$ where $\text{SE}[\hat{f}(x)]$ is the standard error of the mean prediction at x

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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