

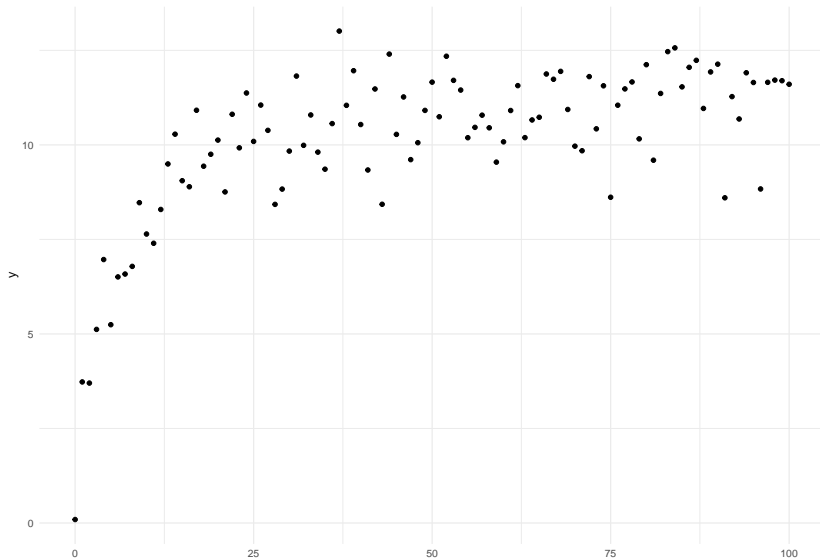
An introduction to GAM(M)s

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Linear models

Some (fairly) linear data...



Linear models

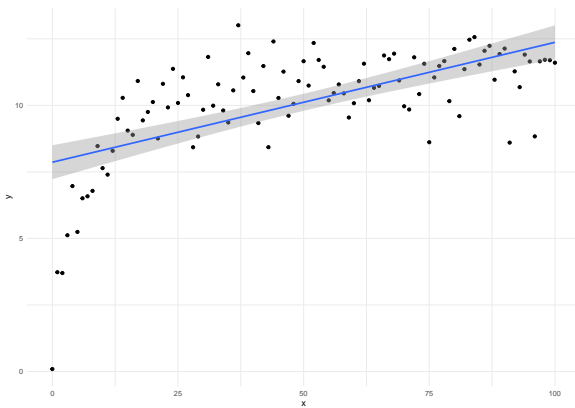
- ▶ A general formula: $y = \beta_0 + \beta_1 x$
 - ▶ y is the **outcome variable**
 - ▶ x is the **predictor**
 - ▶ β_0 is the **intercept**
 - ▶ β_1 is the **slope**
- ▶ We know x and y
 - ▶ we need to estimate β_0, β_1
- ▶ We can add more predictors
 - ▶ $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n$

Linear models

- code in R

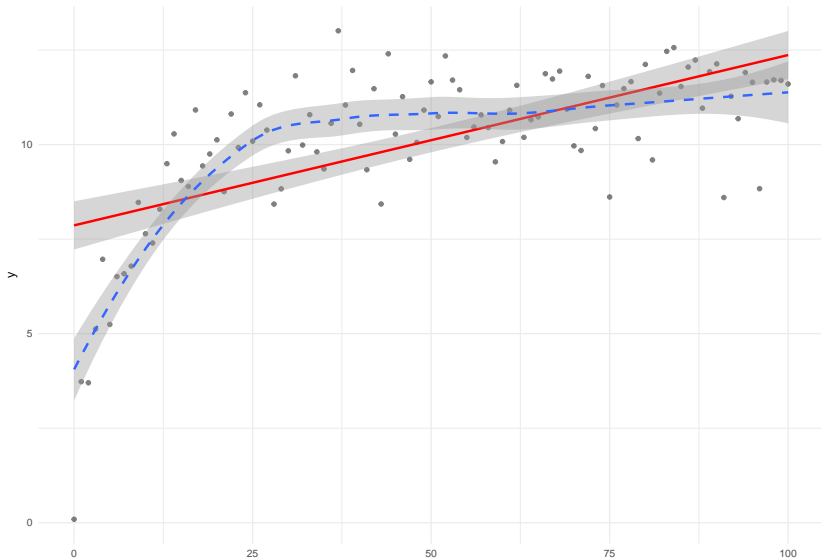
```
lm(y ~ x, data = sim_traj)
```

- estimated intercept and slope



Linear models

Is it linear?



Linear models with non-linear data

How to account for non-linearity in a linear model?

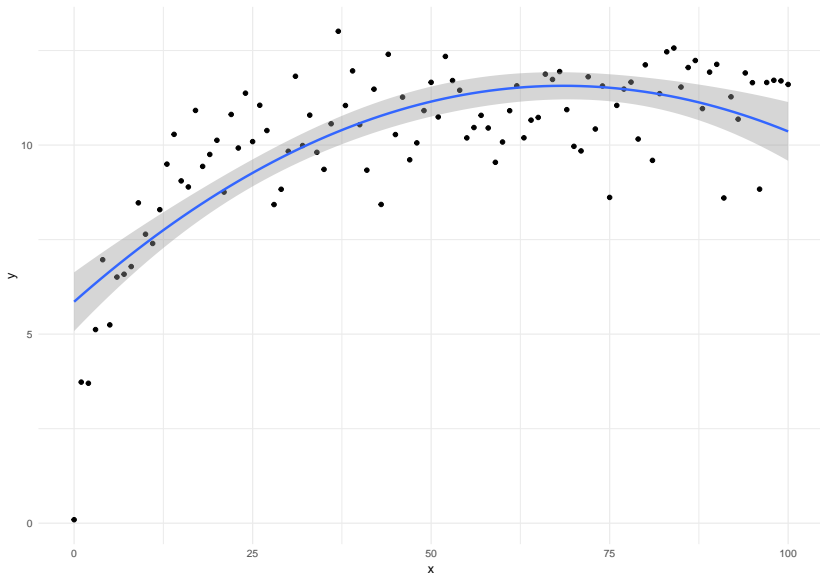
- ▶ Use **higher-degree polynomials**

- ▶ quadratic: $y = \beta_0 + \beta_1x + \beta_2x^2$

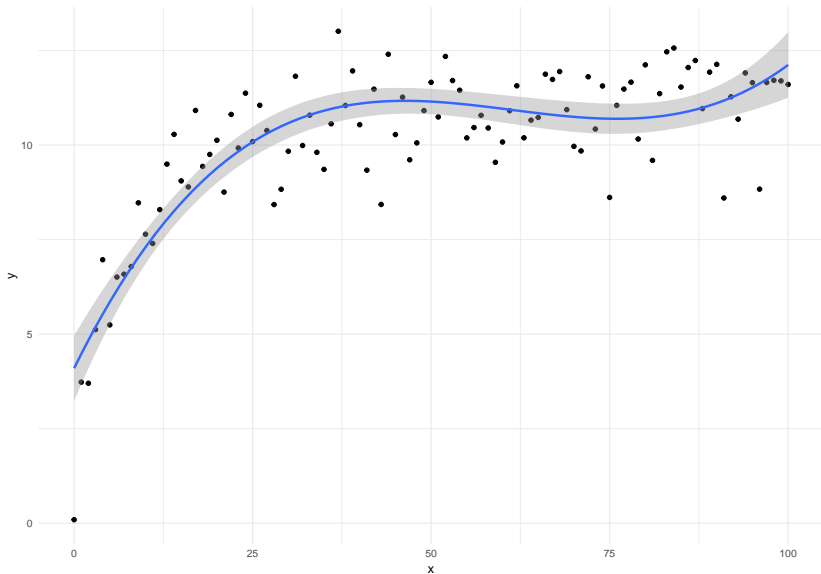
- ▶ cubic: $y = \beta_0 + \beta_1x + \beta_2x^2 + \beta_3x^3$

- ▶ n th: $y = \beta_0 + \beta_1x + \beta_2x^2 + \beta_3x^3 + \dots + \beta_nx^n$

Linear models with non-linear data



Linear models with non-linear data



Linear models with non-linear data

