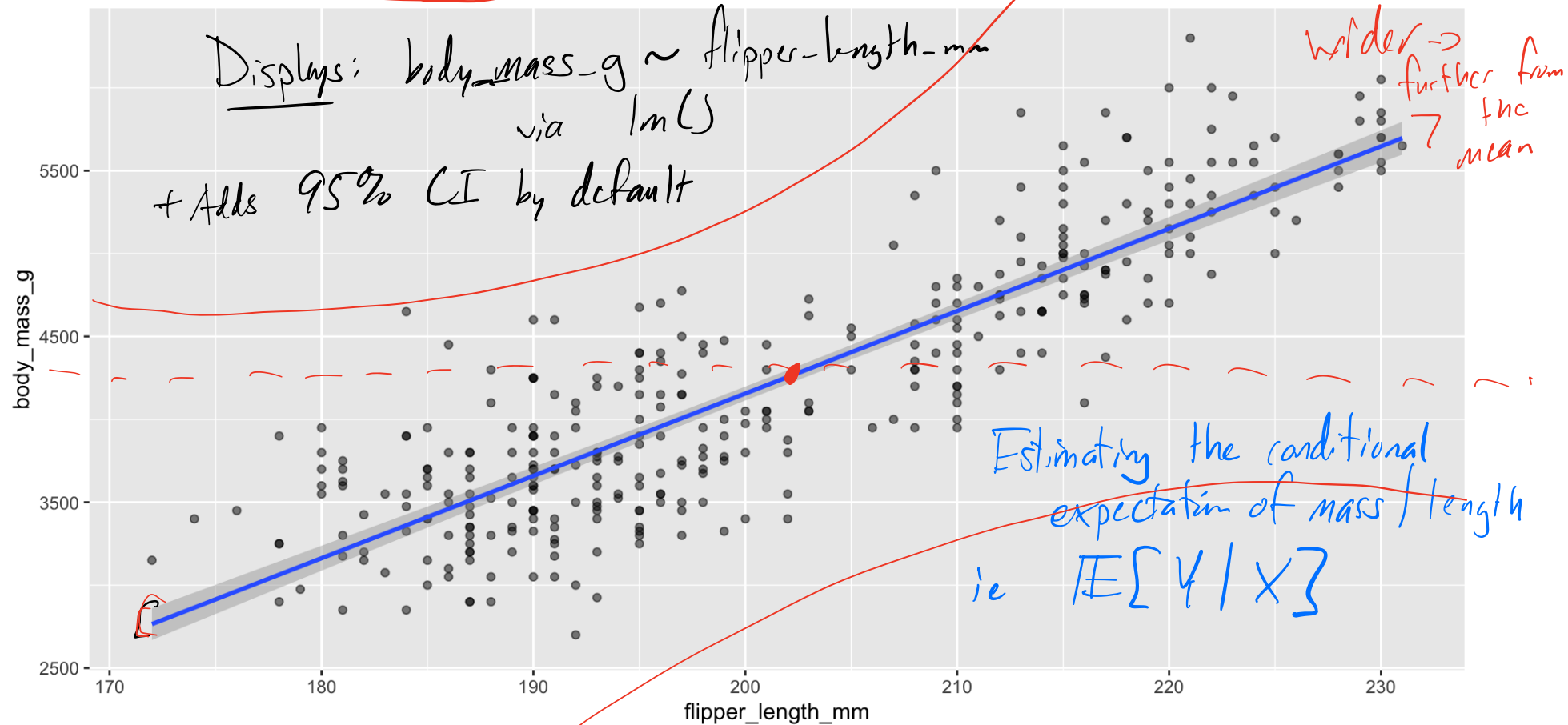# Displaying trend lines: linear regression
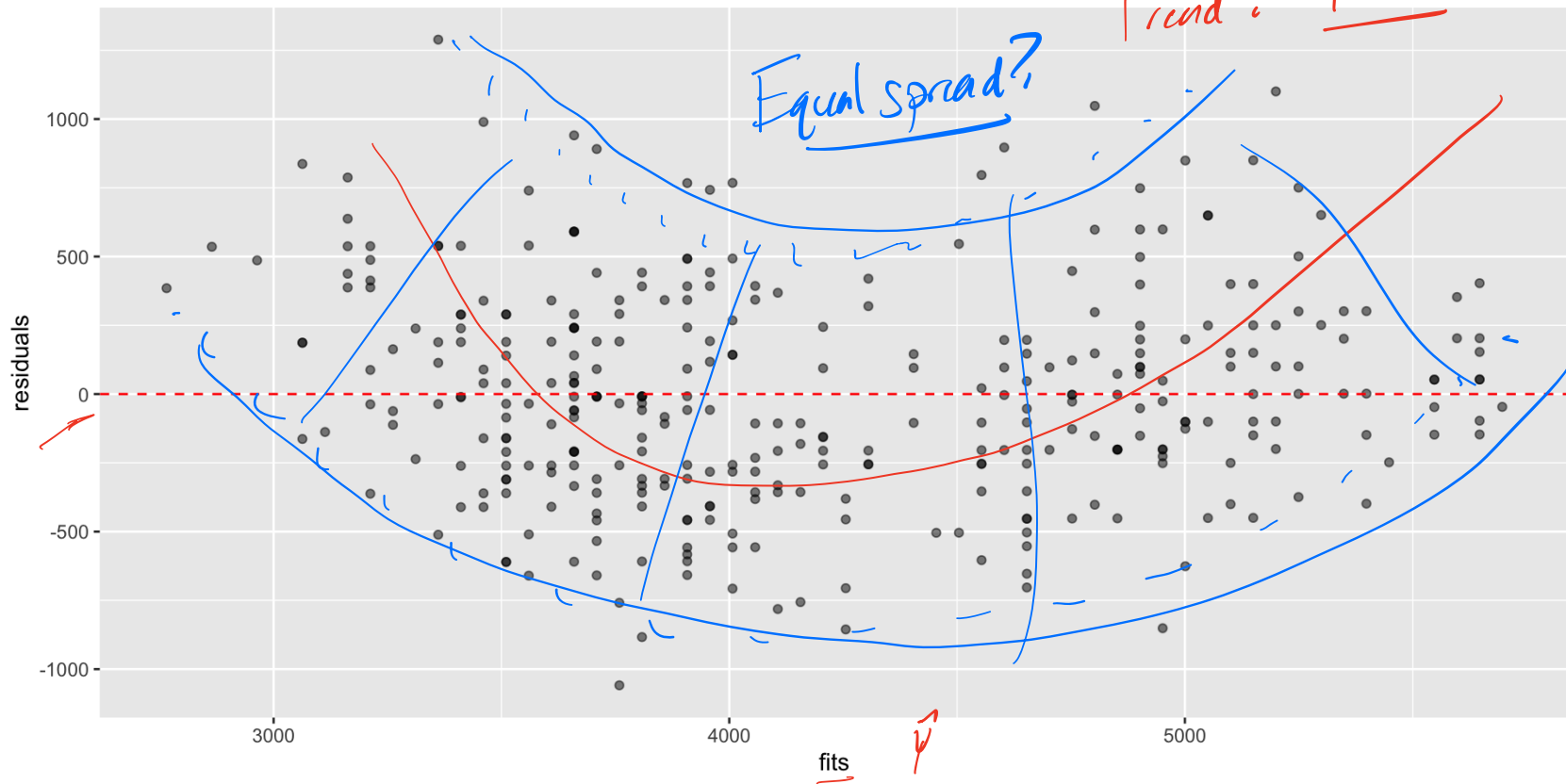
```
1  penguins |>
2    ggplot(aes(x = flipper_length_mm, y = body_mass_g)) +
3    geom_point(alpha = 0.5) +
4    geom_smooth(method = "lm")
```

→ default arg: level = 0.95, se = TRUE

Displays: body_mass_g ~ flipper-length-mm
via lm()

+ Adds 95% CI by default

wider → further from the mean

Estimating the conditional expectation of mass / length

ie $\mathbb{E}[Y | X]$

Residual vs fit plots

```
1  lin_reg <- lm(body_mass_g ~ flipper_length_mm, data = penguins)
2
3  tibble(fits = fitted(lin_reg), residuals = residuals(lin_reg)) |>
4    ggplot(aes(x = fits, y = residuals)) +
5    geom_point(alpha = 0.5) +
6    geom_hline(yintercept = 0, linetype = "dashed", color = "red")
```

Residual vs fit plots

STOPPED
HERE

```
1  tibble(fits = fitted(lin_reg), residuals = residuals(lin_reg)) |>
2    ggplot(aes(x = fits, y = residuals)) +
3    geom_point(alpha = 0.5) +
4    geom_hline(yintercept = 0, linetype = "dashed", color = "red") +
5    geom_smooth()
```

nonlinear