Olympic 100 m Record

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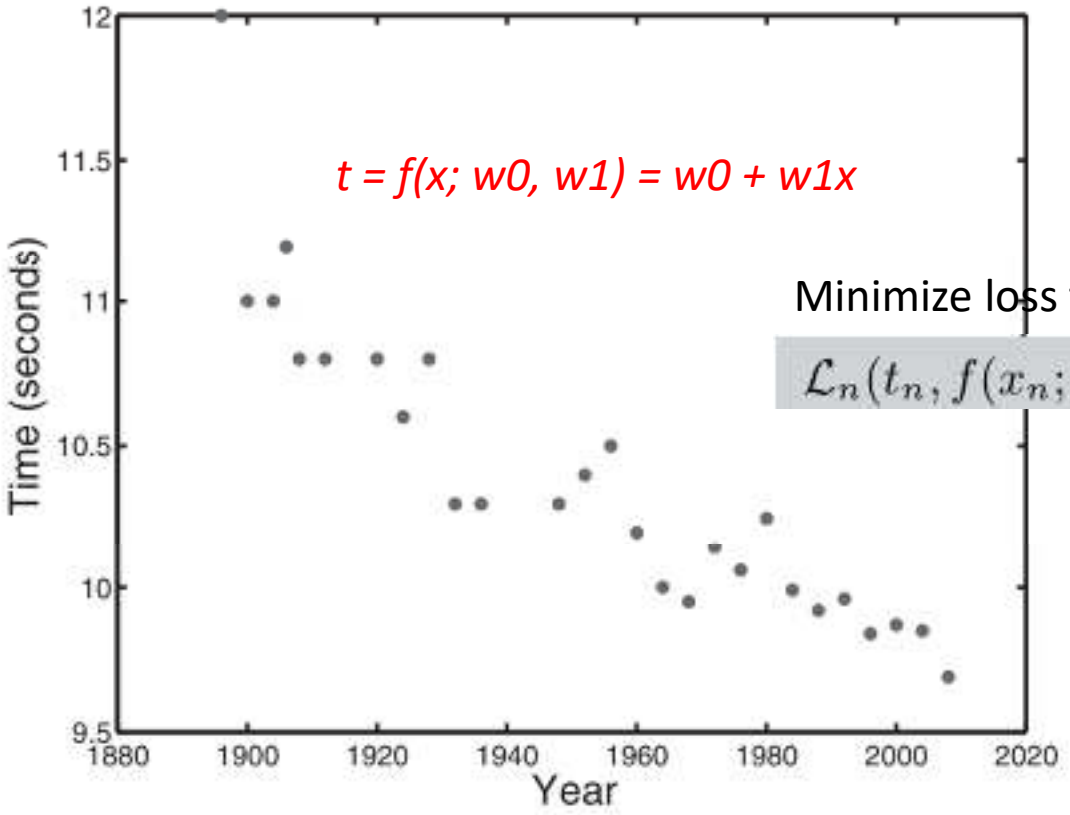
LINEAR MODELLING



t = f(x; w0, w1) = w0 + w1x

Minimize loss function

$$\mathcal{L}_n(t_n, f(x_n; w_0, w_1)) = (t_n - f(x_n; w_0, w_1))^2$$

Winning men's 100 m times at the Summer Olympics since 1896

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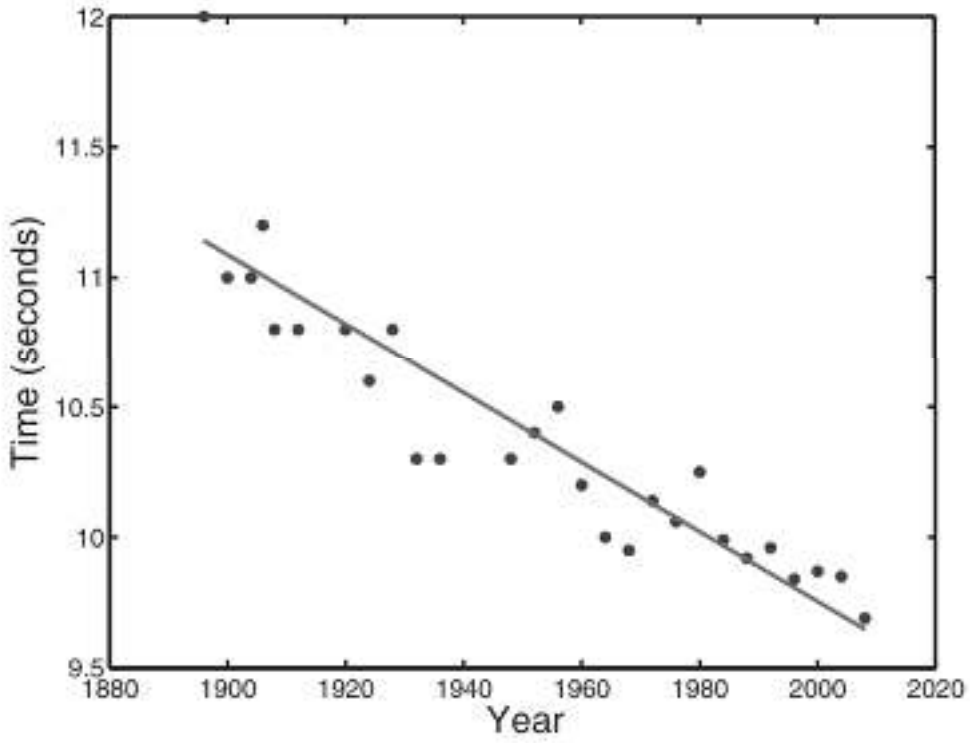
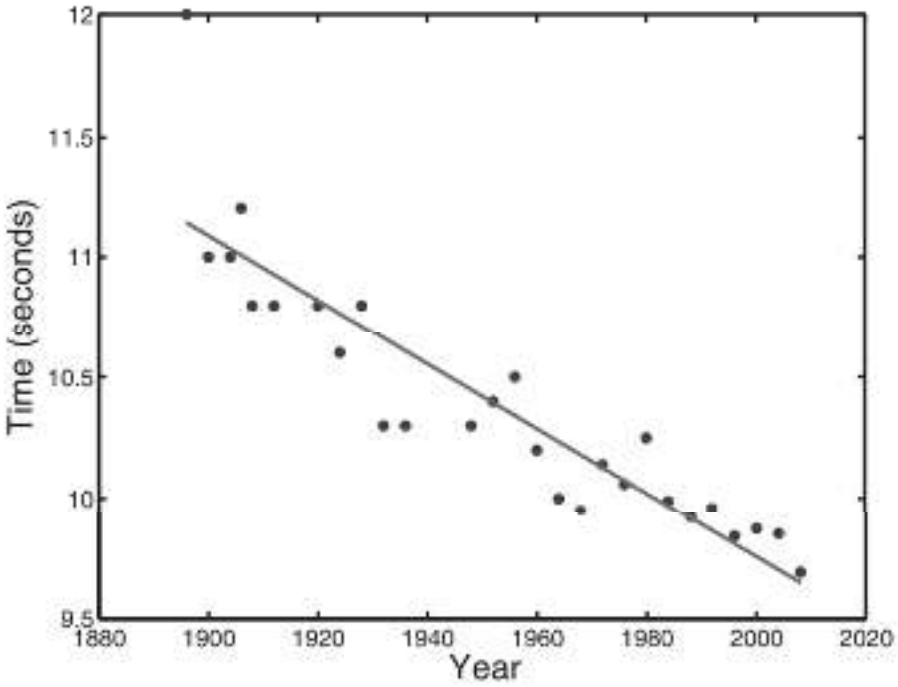
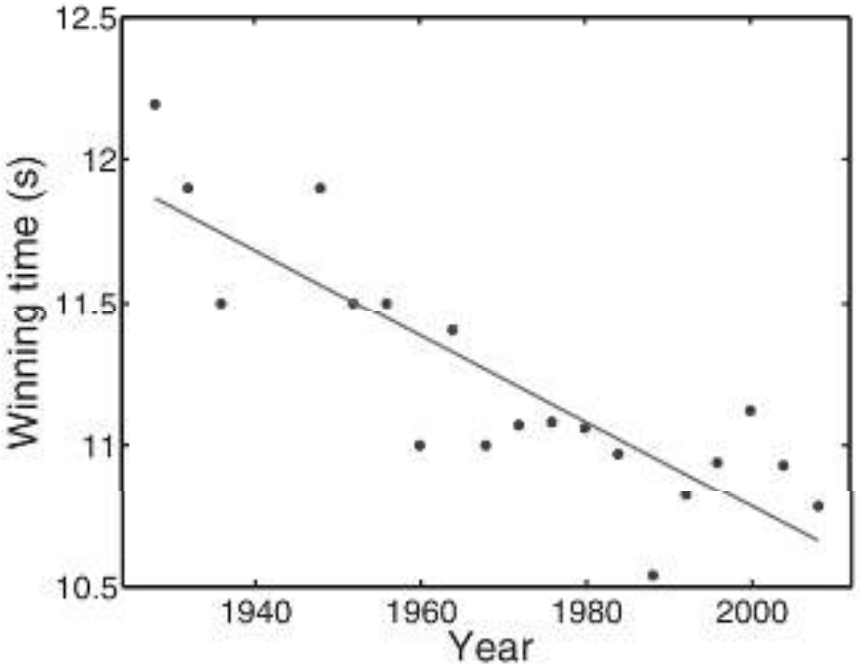


$$f(x; w_0, w_1) = 36.416 - 0.013x$$

LINEAR MODELLING

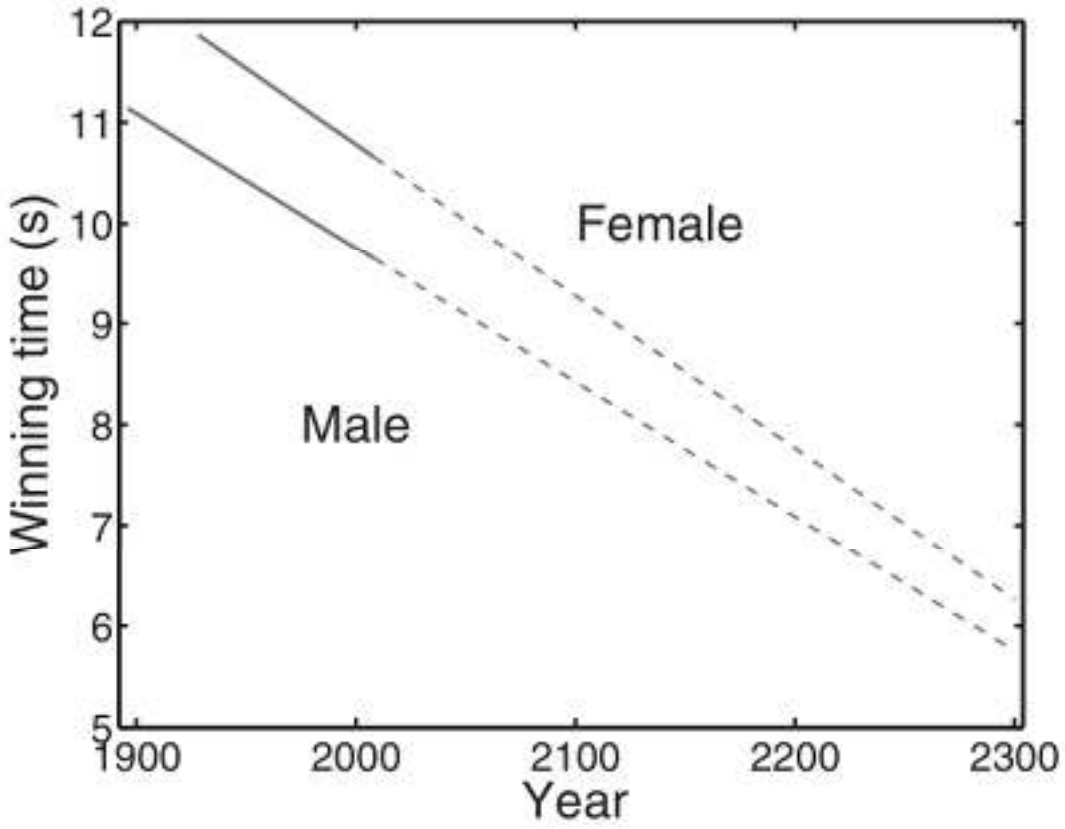


Men's Olympic 100 m data with a linear model



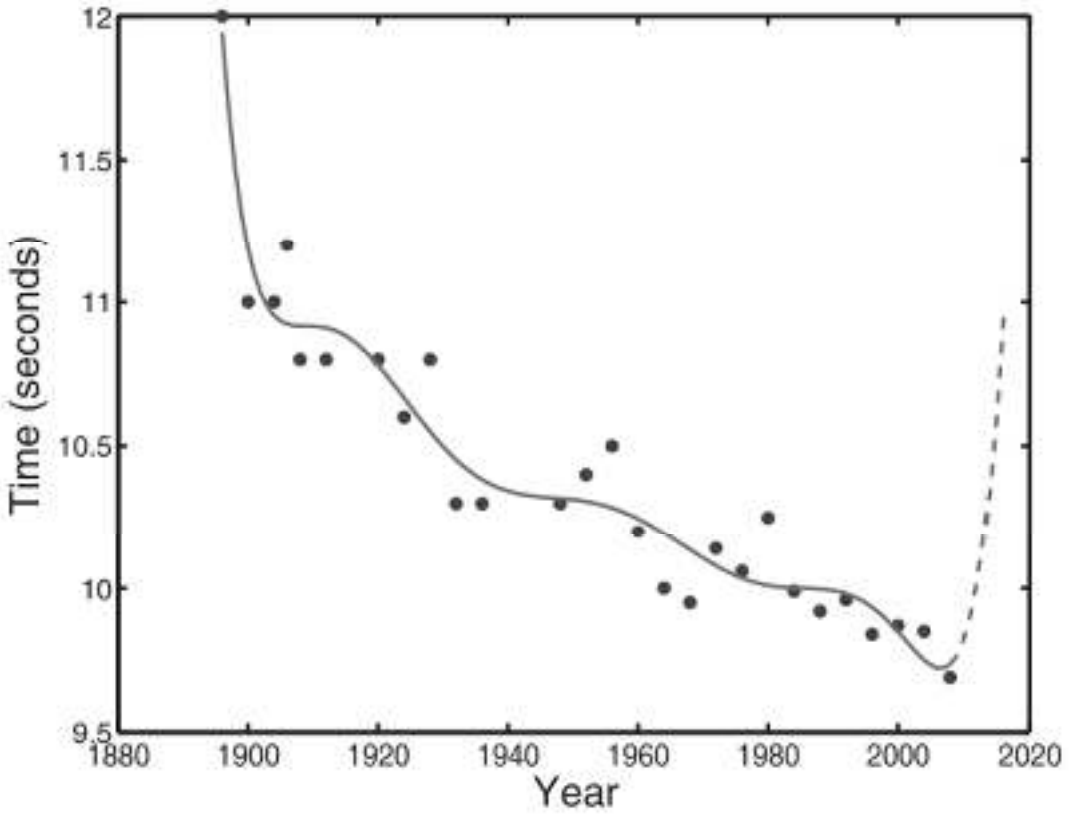
Women's Olympic 100 m data with a linear model

LINEAR MODELLING



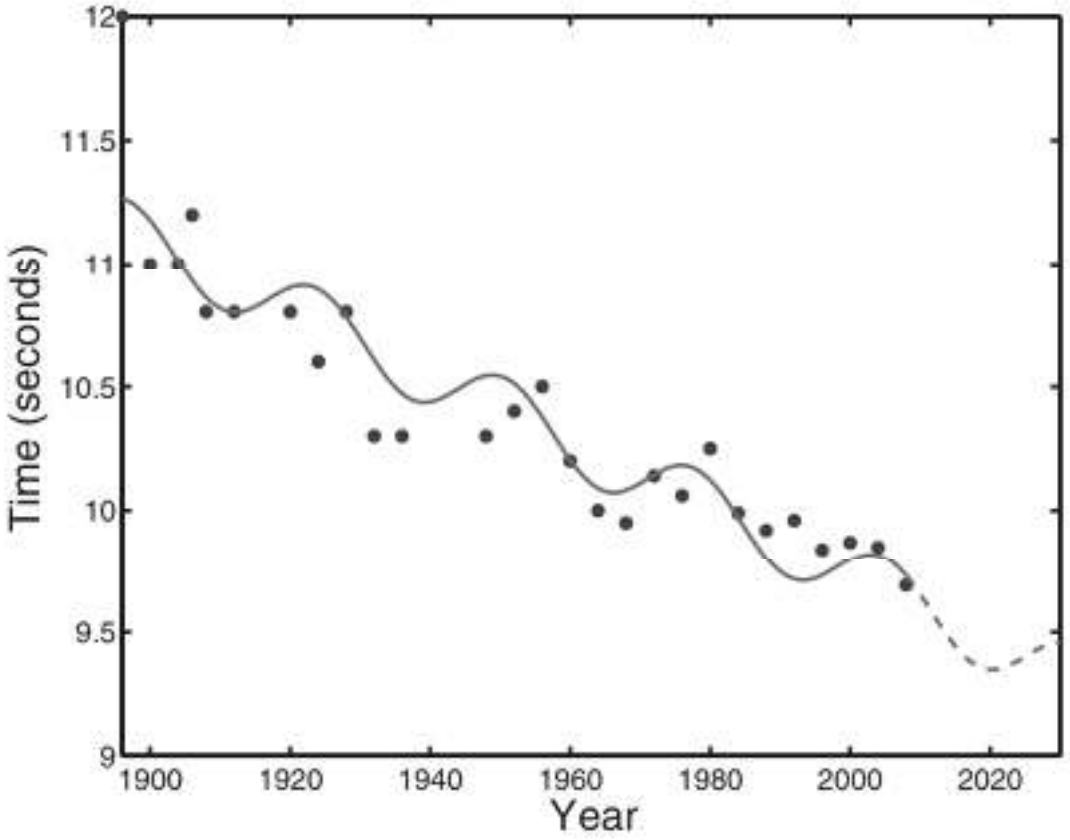
Male and female functions extrapolated into the future

NON-LINEAR MODELLING



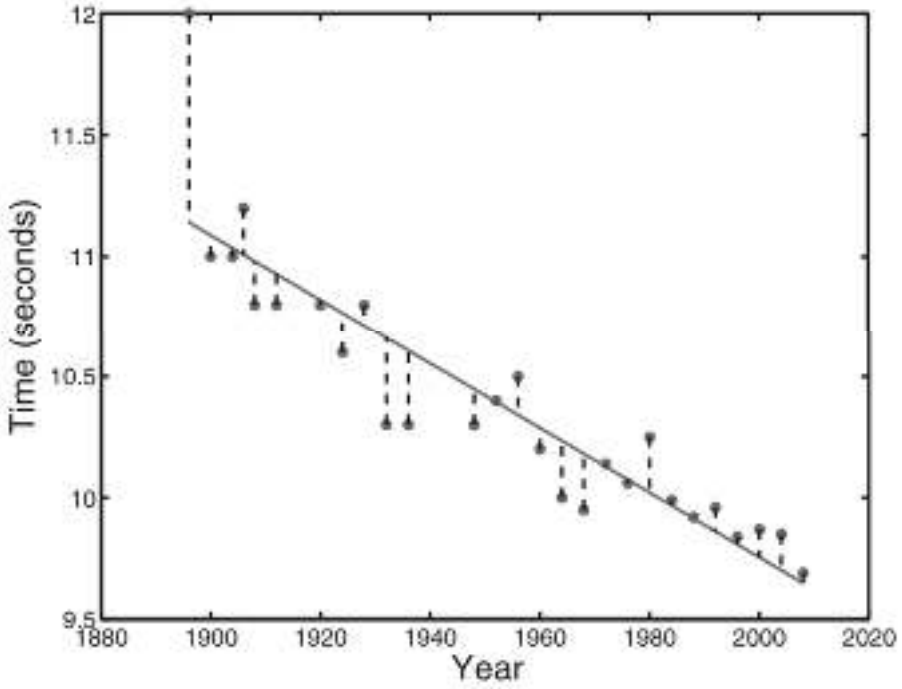
Eighth-order polynomial fitted to the Olympic 100 m men's sprint data

NON-LINEAR MODELLING

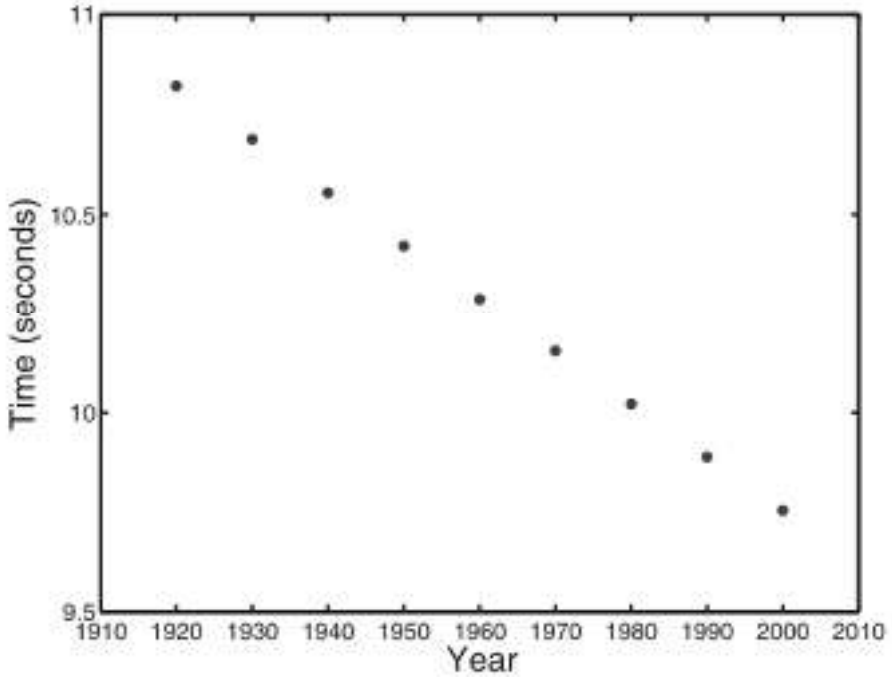


Least squares fit of f(x; w) = w0 + w1x + w2 sin ((x−a)/b)
to the 100 m sprint data (a = 2660, b = 4.3)

MODELING ERRORS AS NOISE



Linear fit to the Olympic men's 100 m data with errors highlighted



Dataset generated from the linear model