Assessing Swimming World Records

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Methods

- Data includes world record setting swimming times since 1900

- Time series methods applied include:
  - S-Curves
  - Single exponential smoothing

- Asymptotics / prediction intervals used as appropriate to estimate future potential world records

World Records Over Time

Event	Original Record	Year Set	Current Record	Year Set
Women's 200m Freestyle	176.00	03/04/1915	112.98	07/29/2009
Women's 400m Freestyle	390.20	08/16/1919	236.46	08/07/2016
Men's 200m Butterfly	139.00	07/11/1959	110.73	07/24/2019
Women's 100m Breaststroke	80.30	07/20/1958	64.13	07/25/2017
Men's 100m Breaststroke	71.40	05/02/1961	56.88	07/21/2019
Men's 100m Backstroke	62.20	12/06/1956	51.85	08/13/2016
Men's 100m Freestyle	65.80	12/03/1905	46.91	07/30/2009
Men's 800m Freestyle	685.40	07/21/1906	452.12	07/29/2009

Women's 100m Breaststroke

S-Curve Trend Model
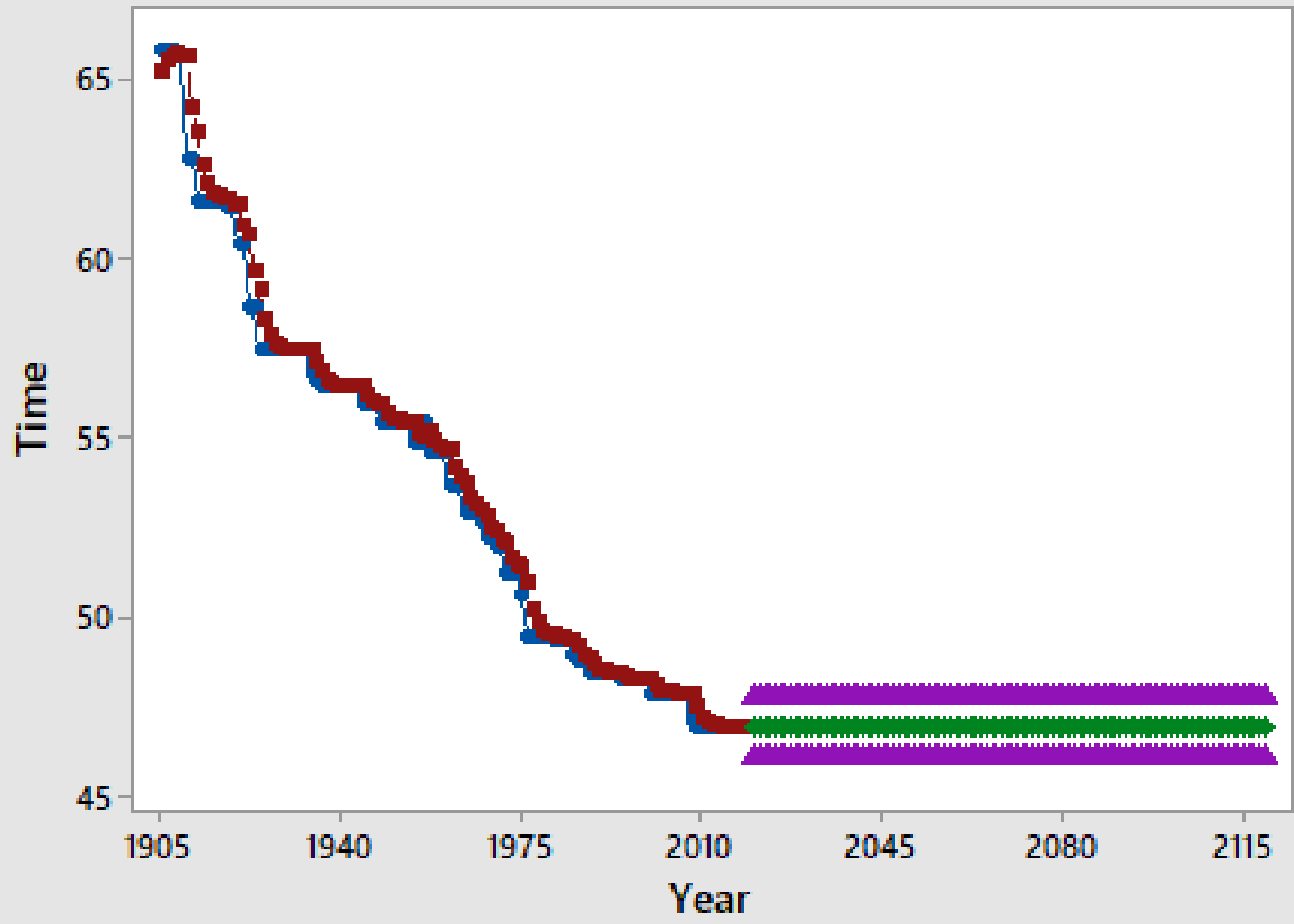
$Y_t = (10^3) / (16.0628 - 3.87841 \times (0.967343^t))$
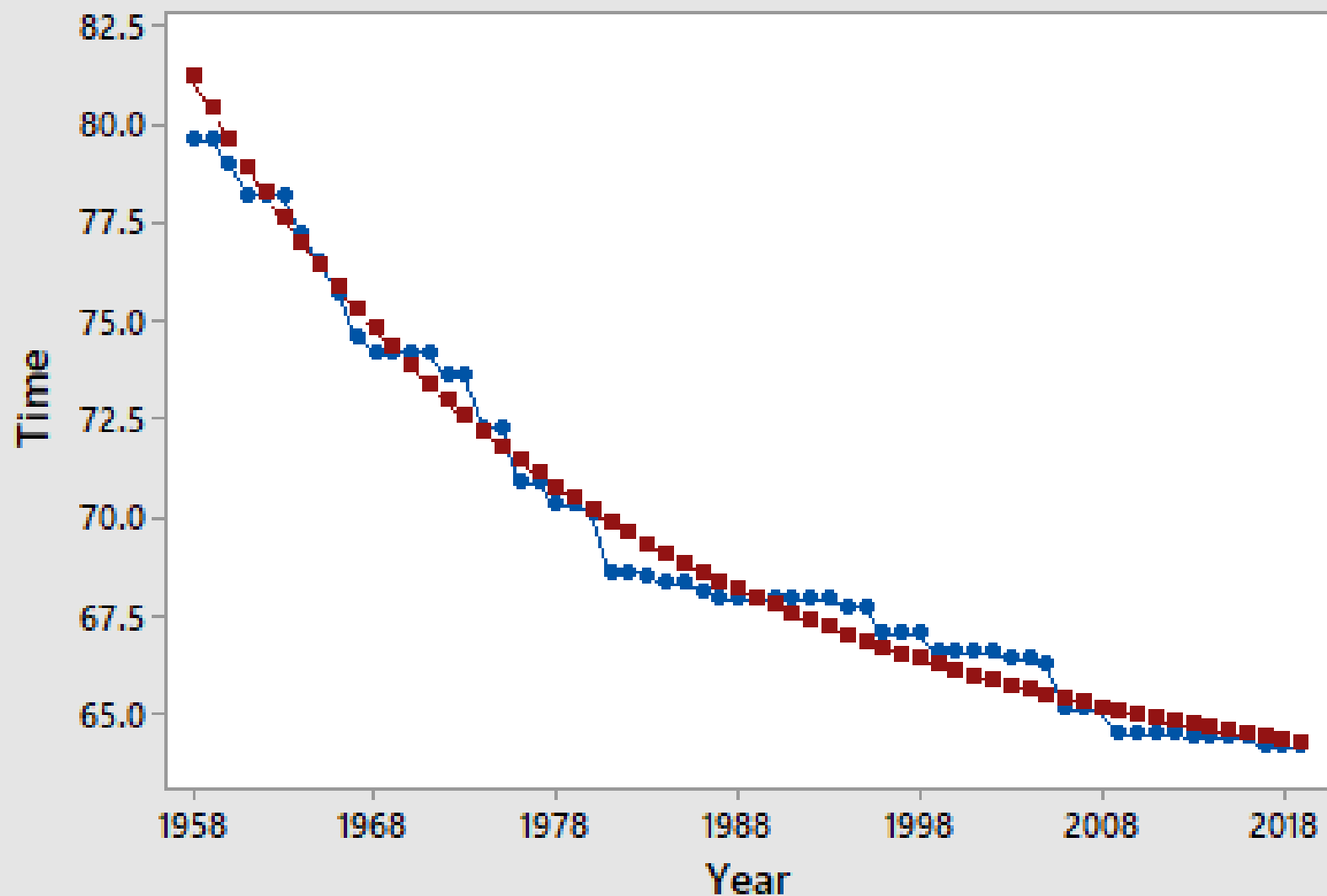
Variable
—•— Actual
—■— Fits

Curve Parameters
Intercept   50.1475
Asymptote   62.2558
Asym. Rate   0.9673

Accuracy Measures
MAPE   0.682782
MAD   0.477344
MSD   0.328269

Results

Event	Current World Record	S-Curve Asymptote	Prediction Bound
Women's 200m Freestyle	112.98	97.04	110.04
Women's 400m Freestyle	236.46	215.99	228.64
Men's 200m Butterfly	110.73	108.68	109.09
Women's 100m Breaststroke	64.13	62.26	62.91
Men's 100m Breaststroke	56.88	47.08	56.18
Men's 100m Backstroke	51.85	49.89	51.05
Men's 100m Freestyle	46.91	-30.95	46.07
Men's 800m Freestyle	452.12	133.56	442.10

Future Research Topics

- How did improved swimsuit technology change the predicted record?
- Are there better prediction methods (outside of the available standard methods)?
- Could this model translate to other timed sports (e.g. running, cycling)?