

# Various cutoffs

Should be

$$\text{Differential}(t)(V) = p_1 + V \cdot p_2 + W \cdot p_4 + p_3 \cdot (V^3)$$

$$\text{Differential}(t)(W) = p_5 + V \cdot p_6 + W \cdot p_7$$

Always the title is `cutoff` and `optimization method`

## Smooth Forward Df

## 2000 & STLSQ

Model ##Basis#388 with 2 equations

States : V W

Parameters : 6

Independent variable: t

Equations

$$\text{Differential}(t)(V) = p_1 + V \cdot p_2 + W \cdot p_4 + p_3 \cdot (V^2)$$

$$\text{Differential}(t)(W) = p_5 + W \cdot p_6$$

Linear Solution with 2 equations and 6 parameters.

Returncode: solved

L<sub>2</sub> Norm error : [74.78388648297391, 25.370167490831182]

AIC : [34110.303086665364, 25566.935128488396]

R<sup>2</sup> : [-1.7705432321293069, 0.48830612769746606]

Parameters:

[0.3, 0.8, -0.4, -0.3, 0.6, -0.31]

## 1000 & SR3

Model ##Basis#405 with 2 equations

States : V W

Parameters : 8

Independent variable: t

Equations

$\text{Differential}(t)(V) = V \cdot p_1 + W \cdot p_4 + p_2 \cdot (V^2) + p_3 \cdot (V^3)$

$\text{Differential}(t)(W) = p_5 + V \cdot p_6 + W \cdot p_8 + p_7 \cdot (V^2)$

Linear Solution with 2 equations and 8 parameters.

Returncode: solved

L<sub>2</sub> Norm error : [211.63117047913556, 1062.8083759316835]

AIC : [47690.18501396972, 62058.069854531444]

R<sup>2</sup> : [-3.0596412951792242, 0.6042583461776001]

Parameters:

[1.09, -0.8, 0.11, -0.15, 0.24, -0.13, 0.21, -0.14]

## 2000 & SR3

Model ##Basis#411 with 2 equations

States : V W

Parameters : 8

Independent variable: t

Equations

$\text{Differential}(t)(V) = p_1 + V \cdot p_2 + p_3 \cdot (V^2) + p_4 \cdot (V^3)$

$\text{Differential}(t)(W) = p_5 + V \cdot p_6 + p_7 \cdot (V^2) + p_8 \cdot (W^2)$

Linear Solution with 2 equations and 8 parameters.

Returncode: solved

L<sub>2</sub> Norm error : [288.2814774371565, 1582.4585434912008]

AIC : [44778.096916964794, 58235.30636382105]

R<sup>2</sup> : [-9.680058684080175, -30.916791253738456]

Parameters:

[-0.5, 1.8, -1.4, 0.29, 0.27, -0.25, 0.3, -0.18]

# Tvdiff Df

## 1000 & SR3

Model ##Basis#507 with 2 equations

States : V W

Parameters : 8

Independent variable: t

Equations

Differential(t)(V) =  $V \cdot p_1 + W \cdot p_4 + p_2 \cdot (V^2) + p_3 \cdot (V^3)$

Differential(t)(W) =  $p_5 + V \cdot p_6 + W \cdot p_8 + p_7 \cdot (V^2)$

Linear Solution with 2 equations and 8 parameters.

Returncode: solved

L<sub>2</sub> Norm error : [211.3101858827484, 1053.3627931231706]

AIC : [47676.671431685485, 61978.59180147926]

R<sup>2</sup> : [-3.054002039146713, 0.6099054364959031]

Parameters:

[1.09, -0.8, 0.11, -0.15, 0.24, -0.13, 0.21, -0.14]

## 1 & SR3

Model ##Basis#446 with 2 equations

States : V W

Parameters : p<sub>1</sub> p<sub>2</sub> p<sub>3</sub> p<sub>4</sub>

Independent variable: t

Equations

Differential(t)(V) = 0

Differential(t)(W) =  $p_1 + V \cdot p_2 + W \cdot p_4 + p_3 \cdot (V^2)$

Linear Solution with 2 equations and 4 parameters.

Returncode: solved

L<sub>2</sub> Norm error : [155.0710066105855, 9291.229194306132]

AIC : [49952.53064617247, 90480.8524061853]

R<sup>2</sup> : [-0.30329307021503427, 0.8870442179710343]

Parameters:

[0.27, -0.28, 0.26, -0.11]

# With smoothing and without supplied derivative

## 1000 & SR3 & GaussianKernel

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