

# **Validation process for BELLO**

**The epidemiology research group, EAFIT**

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# Table of Contents

<a href="#">Chapter 1. Extension number1</a>	1
<a href="#">1.1. Basic information</a>	1
<a href="#">1.2. Estimated parameters with their intervals</a>	1
<a href="#">1.3. Identifiability analysis</a>	2
<a href="#">1.4. Uncertainty analysis</a>	5
<a href="#">Chapter 2. Extension number2</a>	6
<a href="#">2.1. Basic information</a>	6
<a href="#">2.2. Estimated parameters with their intervals</a>	6
<a href="#">2.3. Identifiability analysis</a>	7
<a href="#">2.4. Uncertainty analysis</a>	10
<a href="#">Chapter 3. Extension number3</a>	11
<a href="#">3.1. Basic information</a>	11
<a href="#">3.2. Estimated parameters with their intervals</a>	11
<a href="#">3.3. Identifiability analysis</a>	12
<a href="#">3.4. Uncertainty analysis</a>	15
<a href="#">Chapter 4. Extension number4</a>	16
<a href="#">4.1. Basic information</a>	16
<a href="#">4.2. Estimated parameters with their intervals</a>	16
<a href="#">4.3. Identifiability analysis</a>	17
<a href="#">4.4. Uncertainty analysis</a>	20
<a href="#">Chapter 5. Extension number5</a>	21
<a href="#">5.1. Basic information</a>	21
<a href="#">5.2. Estimated parameters with their intervals</a>	21
<a href="#">5.3. Identifiability analysis</a>	22
<a href="#">5.4. Uncertainty analysis</a>	25
<a href="#">Chapter 6. Extension number6</a>	26
<a href="#">6.1. Basic information</a>	26
<a href="#">6.2. Estimated parameters with their intervals</a>	26
<a href="#">6.3. Identifiability analysis</a>	27
<a href="#">6.4. Uncertainty analysis</a>	30
<a href="#">Chapter 7. Extension number7</a>	31
<a href="#">7.1. Basic information</a>	31
<a href="#">7.2. Estimated parameters with their intervals</a>	31
<a href="#">7.3. Identifiability analysis</a>	32
<a href="#">7.4. Uncertainty analysis</a>	35
<a href="#">Chapter 8. Extension number8</a>	36
<a href="#">8.1. Basic information</a>	36
<a href="#">8.2. Estimated parameters with their intervals</a>	36
<a href="#">8.3. Identifiability analysis</a>	37
<a href="#">8.4. Uncertainty analysis</a>	40
<a href="#">Chapter 9. Extension number9</a>	41
<a href="#">9.1. Basic information</a>	41
<a href="#">9.2. Estimated parameters with their intervals</a>	41

<a href="#">9.3. Identifiability analysis</a> .....	42
<a href="#">9.4. Uncertainty analysis</a> .....	45
Chapter 10. <a href="#">Extension number10</a> .....	46
<a href="#">10.1. Basic information</a> .....	46
<a href="#">10.2. Estimated parameters with their intervals</a> .....	46
<a href="#">10.3. Identifiability analysis</a> .....	47
<a href="#">10.4. Uncertainty analysis</a> .....	50
Chapter 11. <a href="#">Extension number11</a> .....	51
<a href="#">11.1. Basic information</a> .....	51
<a href="#">11.2. Estimated parameters with their intervals</a> .....	51
<a href="#">11.3. Identifiability analysis</a> .....	52
<a href="#">11.4. Uncertainty analysis</a> .....	55
Chapter 12. <a href="#">Extension number12</a> .....	56
<a href="#">12.1. Basic information</a> .....	56
<a href="#">12.2. Estimated parameters with their intervals</a> .....	56
<a href="#">12.3. Identifiability analysis</a> .....	57
<a href="#">12.4. Uncertainty analysis</a> .....	60
Chapter 13. <a href="#">Extension number13</a> .....	61
<a href="#">13.1. Basic information</a> .....	61
<a href="#">13.2. Estimated parameters with their intervals</a> .....	61
<a href="#">13.3. Identifiability analysis</a> .....	62
<a href="#">13.4. Uncertainty analysis</a> .....	65
Chapter 14. <a href="#">Extension number14</a> .....	66
<a href="#">14.1. Basic information</a> .....	66
<a href="#">14.2. Estimated parameters with their intervals</a> .....	66
<a href="#">14.3. Identifiability analysis</a> .....	67
<a href="#">14.4. Uncertainty analysis</a> .....	70
Chapter 15. <a href="#">Extension number15</a> .....	71
<a href="#">15.1. Basic information</a> .....	71
<a href="#">15.2. Estimated parameters with their intervals</a> .....	71
<a href="#">15.3. Identifiability analysis</a> .....	72
<a href="#">15.4. Uncertainty analysis</a> .....	75

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## Chapter 1. Extension number1

### 1.1. Basic information

The extension to be validated consists of the time series from the data1 to the 103. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

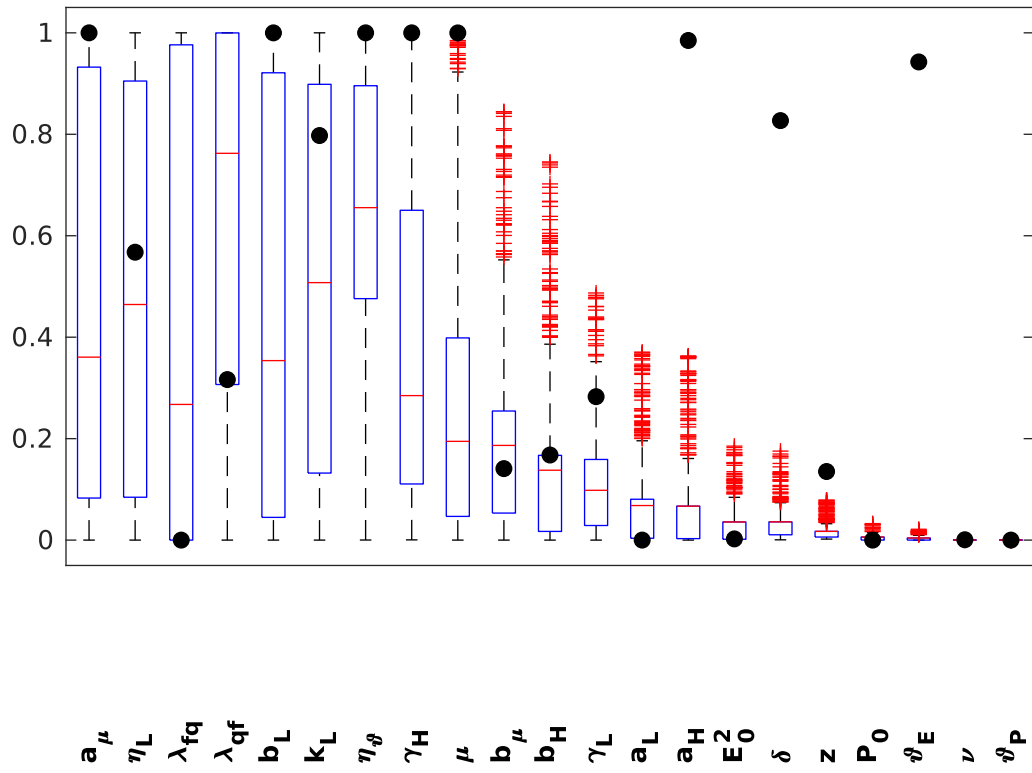
### 1.2. Estimated parameters with their intervals

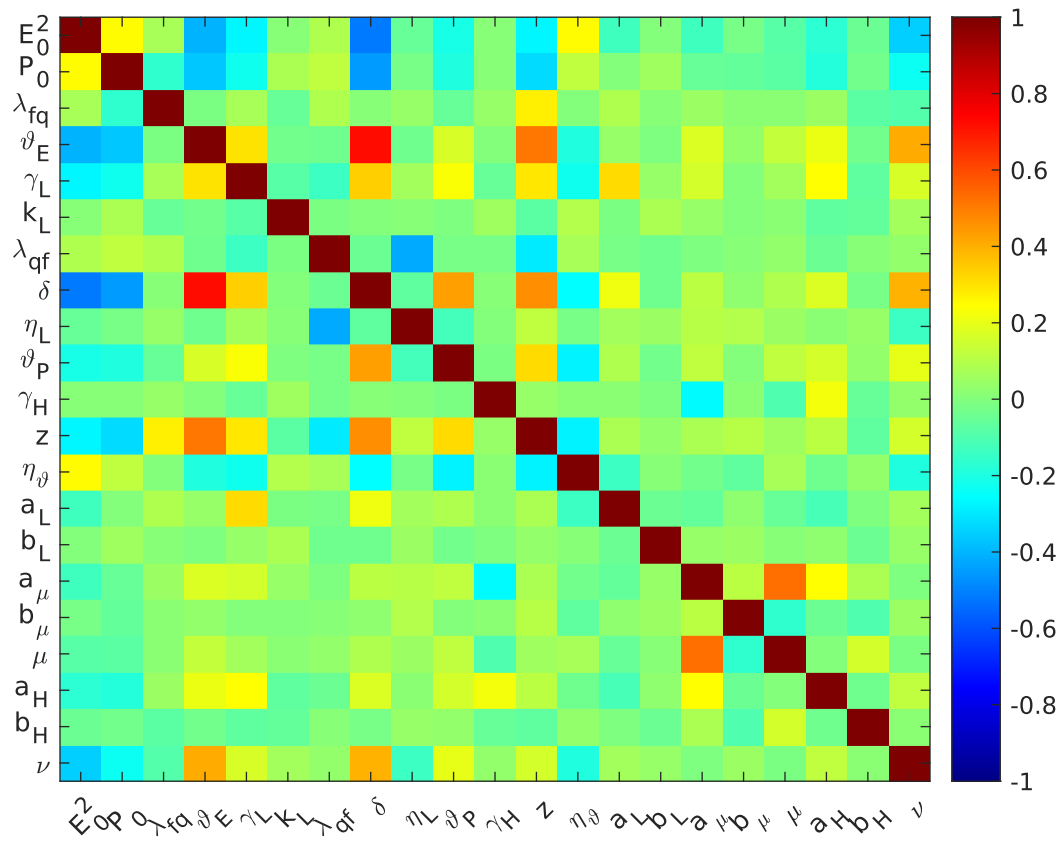
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

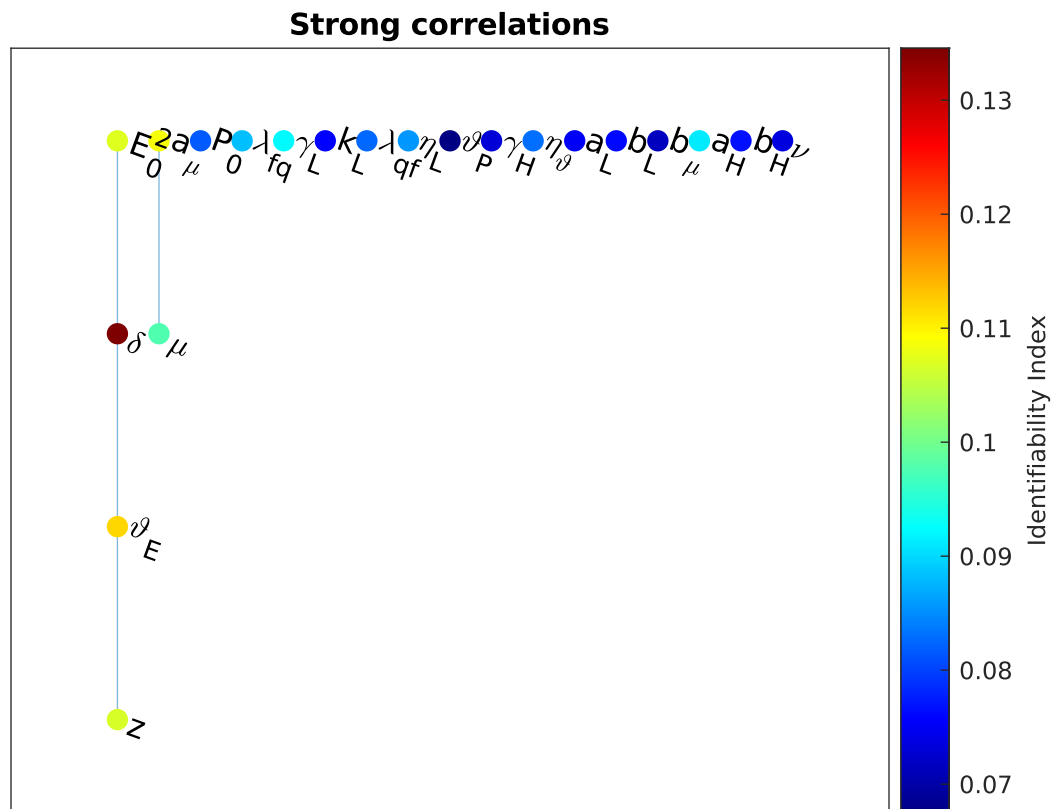
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$E^2_0$	'4.082'	'5.0216'	'71.5669'	'4.7407'	'0.1072'
$P_0$	'0'	'0'	'2.3992'	'0'	'0.0819'
$\lambda_{fq}$	'0'	'0'	'0.2674'	'0'	'0.0883'
$\vartheta_E$	'0.9389'	'0.9426'	'0.0041'	'0.9426'	'0.1118'
$\gamma_L$	'0.2621'	'0.2852'	'0.0982'	'0.2828'	'0.0922'
$k_L$	'1.45'	'10'	'5.5681'	'8.1778'	'0.0759'
$\lambda_{qf}$	'0'	'0.7119'	'0.7625'	'0.3164'	'0.0825'
$\delta$	'0.0936'	'0.1249'	'0.0054'	'0.124'	'0.1346'
$\eta_L$	'0.3217'	'0.9323'	'0.4644'	'0.5675'	'0.0858'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0675'
$\gamma_H$	'0.633'	'1'	'0.2848'	'1'	'0.0732'
$z$	'3.9345'	'4.1934'	'0.5168'	'4.0559'	'0.1068'
$\eta_{\vartheta}$	'0.5594'	'1'	'0.6554'	'1'	'0.0831'
$a_L$	'1'	'1.1333'	'1.9538'	'1'	'0.0753'
$b_L$	'13.3653'	'15'	'5.9537'	'14.999'	'0.0764'
$a_{\mu}$	'13.8621'	'15'	'6.0492'	'14.9998'	'0.1088'
$b_{\mu}$	'2.7752'	'3.2116'	'3.6131'	'2.9728'	'0.0715'
$\mu$	'0.6623'	'1'	'0.1947'	'0.9998'	'0.0977'
$a_H$	'13.1225'	'15'	'1.9372'	'14.7889'	'0.0912'
$b_H$	'2.7504'	'3.3722'	'2.9288'	'3.3482'	'0.0769'
$\nu$	'0.0195'	'0.7407'	'0.0165'	'0.346'	'0.0737'

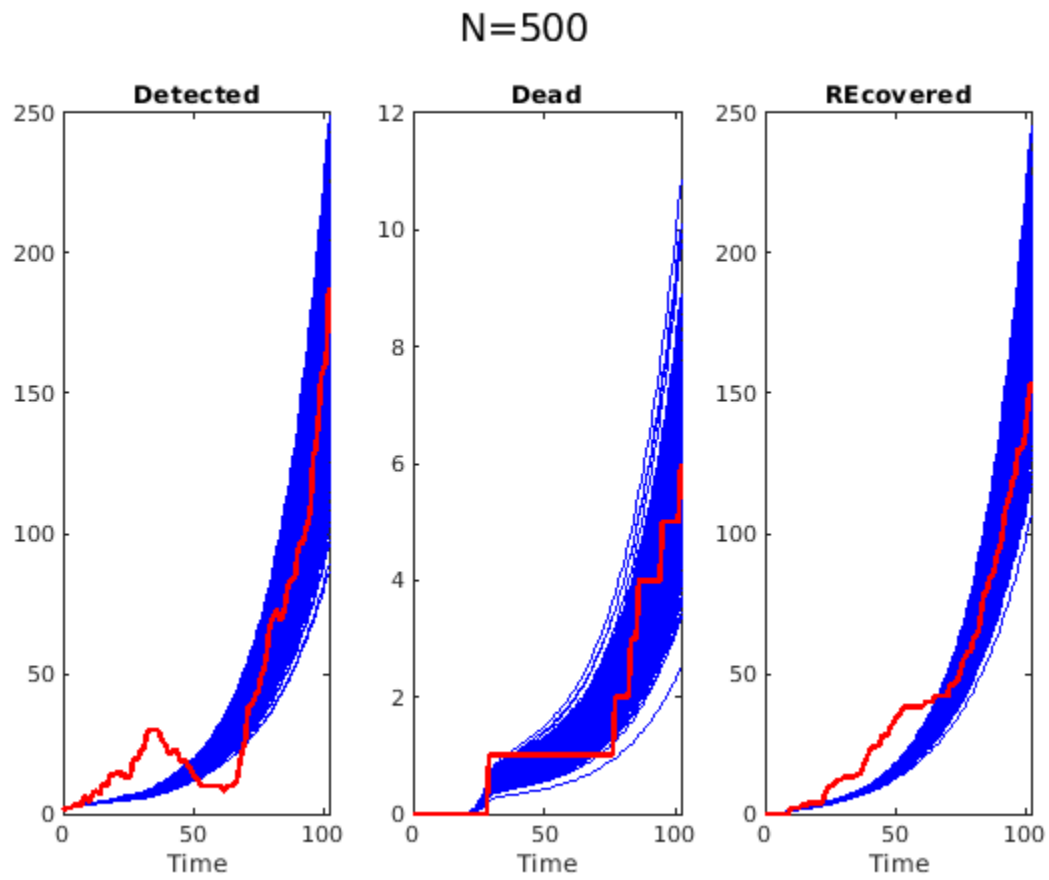
### 1.3. Identifiability analysis







## 1.4. Uncertainty analysis





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## Chapter 2. Extension number2

### 2.1. Basic information

The extension to be validated consists of the time series from the data103 to the 139. The status of the validation is: COMPLETED.

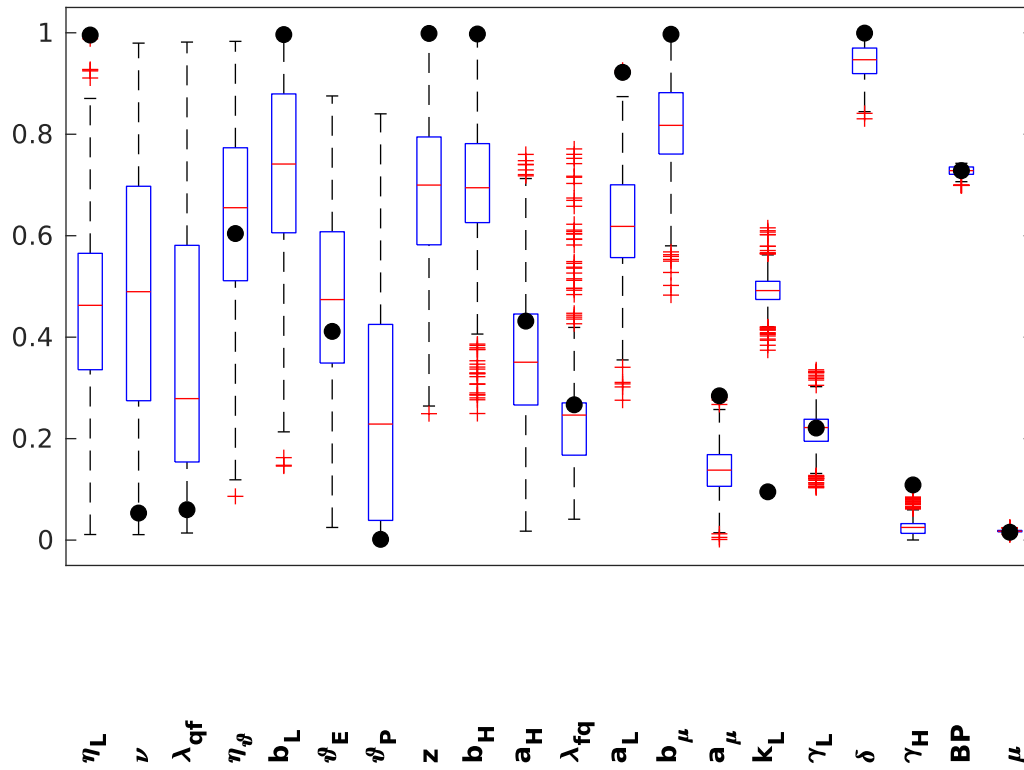
The number of estimations needed to perform the validation was1000.

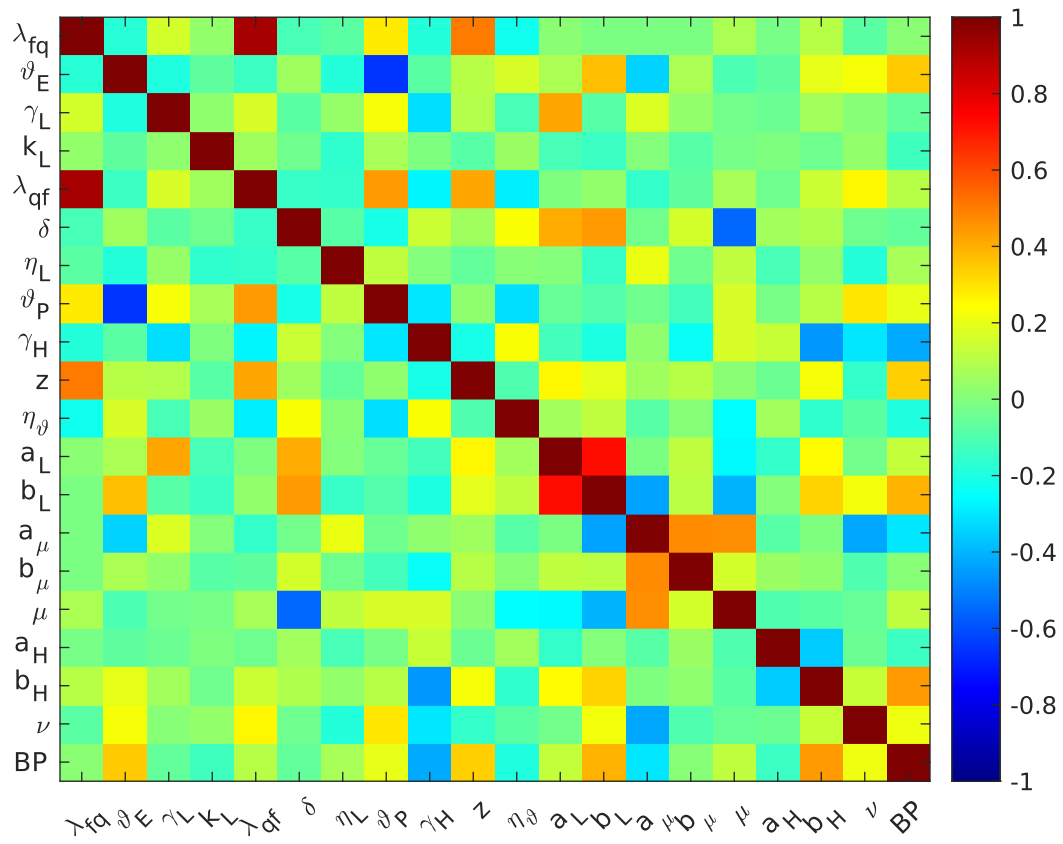
### 2.2. Estimated parameters with their intervals

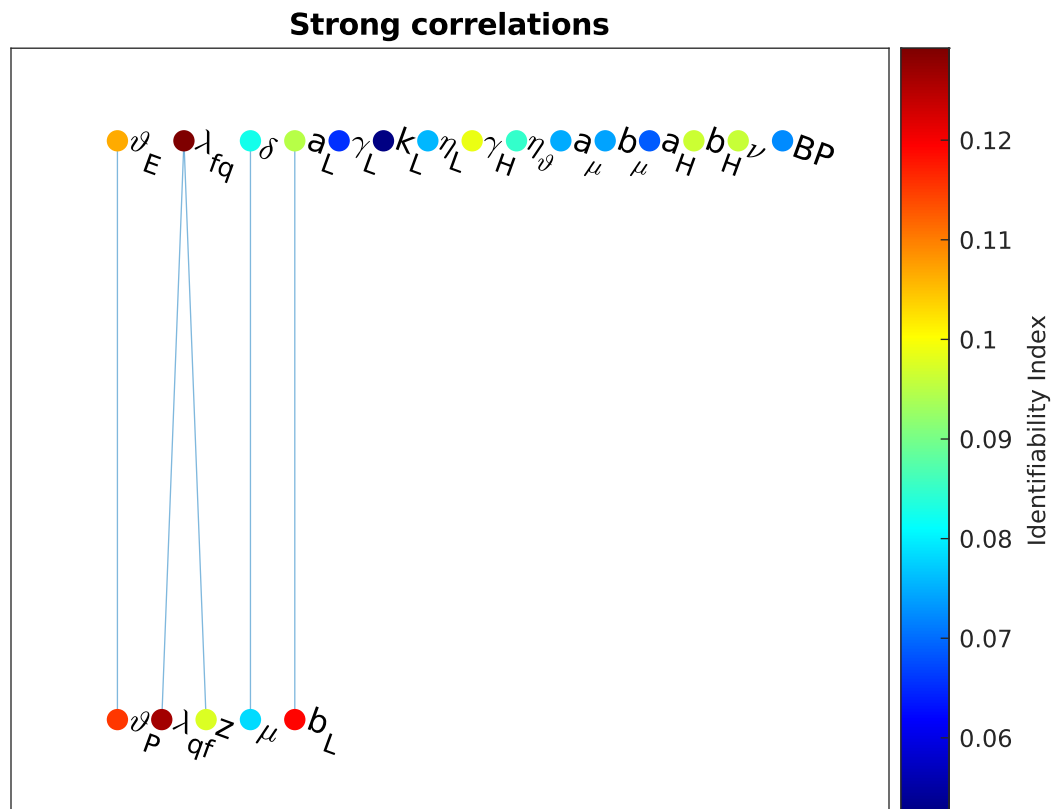
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.205'	'0.2878'	'0.2464'	'0.2667'	'0.1292'
$\vartheta_E$	'0.4504'	'0.4978'	'0.4741'	'0.4114'	'0.1067'
$\gamma_L$	'0.2104'	'0.2333'	'0.2219'	'0.2209'	'0.0656'
$k_L$	'5.3076'	'5.5453'	'5.4265'	'1.8567'	'0.0525'
$\lambda_{qf}$	'0.2385'	'0.3193'	'0.2789'	'0.06'	'0.1263'
$\delta$	'0.1409'	'0.1432'	'0.142'	'0.1499'	'0.0827'
$\eta_L$	'0.4344'	'0.4912'	'0.4628'	'0.9956'	'0.0758'
$\vartheta_P$	'0.1974'	'0.2601'	'0.2287'	'0.0015'	'0.1154'
$\gamma_H$	'0'	'0.0523'	'0.025'	'0.1088'	'0.0989'
$z$	'20.3388'	'21.6502'	'20.9945'	'29.9618'	'0.0976'
$\eta_{\vartheta}$	'0.6297'	'0.6807'	'0.6552'	'0.6043'	'0.0851'
$a_L$	'9.4197'	'9.8947'	'9.6572'	'13.9078'	'0.0948'
$b_L$	'11.0087'	'11.7476'	'11.3781'	'14.9504'	'0.1193'
$a_{\mu}$	'2.8145'	'3.0472'	'2.9309'	'4.9818'	'0.0748'
$b_{\mu}$	'12.1041'	'12.7867'	'12.4454'	'14.9593'	'0.0744'
$\mu$	'0.0171'	'0.018'	'0.0176'	'0.0155'	'0.0784'
$a_H$	'5.5617'	'6.2561'	'5.9089'	'7.0429'	'0.069'
$b_H$	'10.2909'	'11.1566'	'10.7238'	'14.9664'	'0.0965'
$\nu$	'227.1029'	'262.5406'	'244.8217'	'26.663'	'0.0963'
BP	'101.3023'	'101.6977'	'101.5'	'101.4988'	'0.0725'

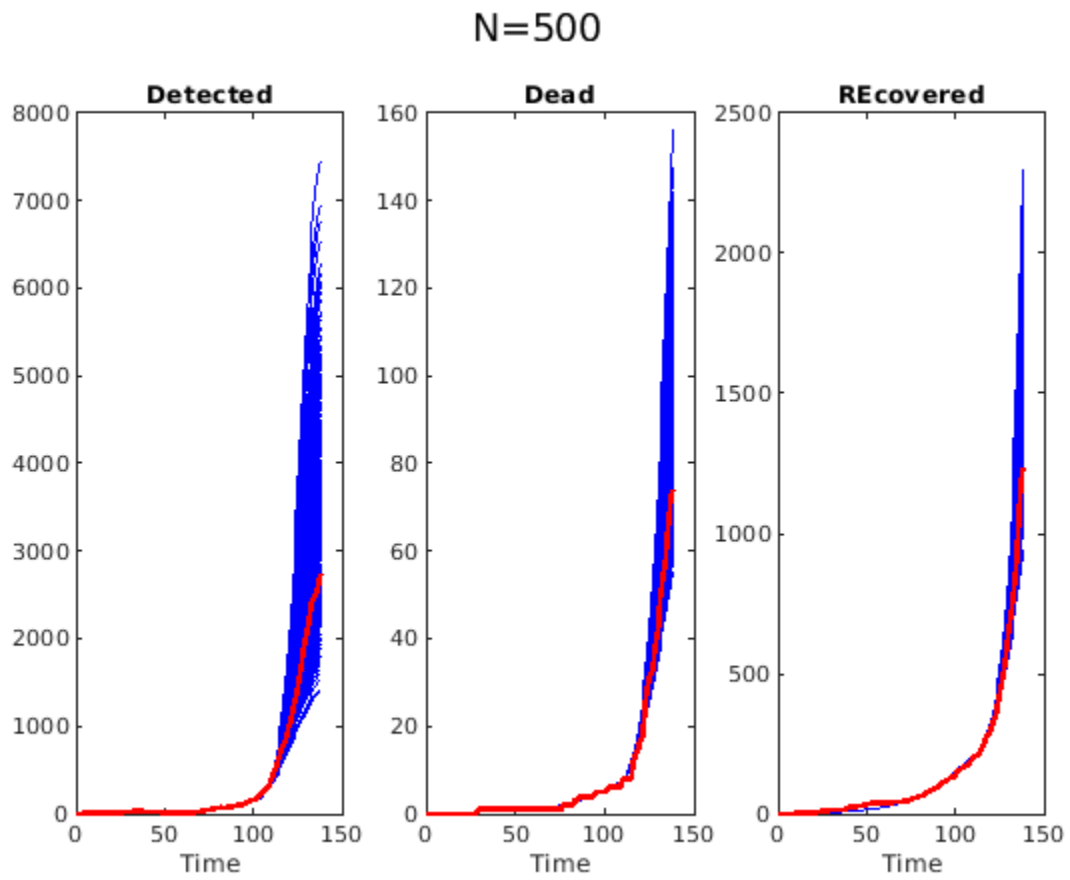
### 2.3. Identifiability analysys







## 2.4. Uncertainty analysys



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## Chapter 3. Extension number3

### 3.1. Basic information

The extension to be validated consists of the time series from the data139 to the 179. The status of the validation is: COMPLETED.

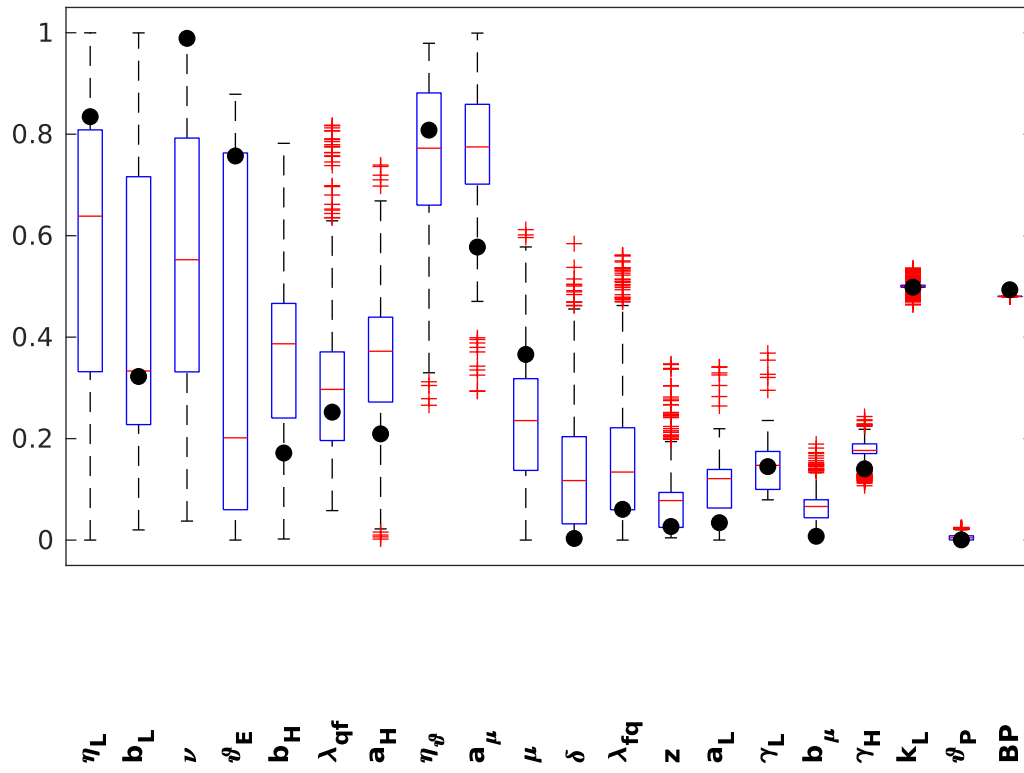
The number of estimations needed to perform the validation was1000.

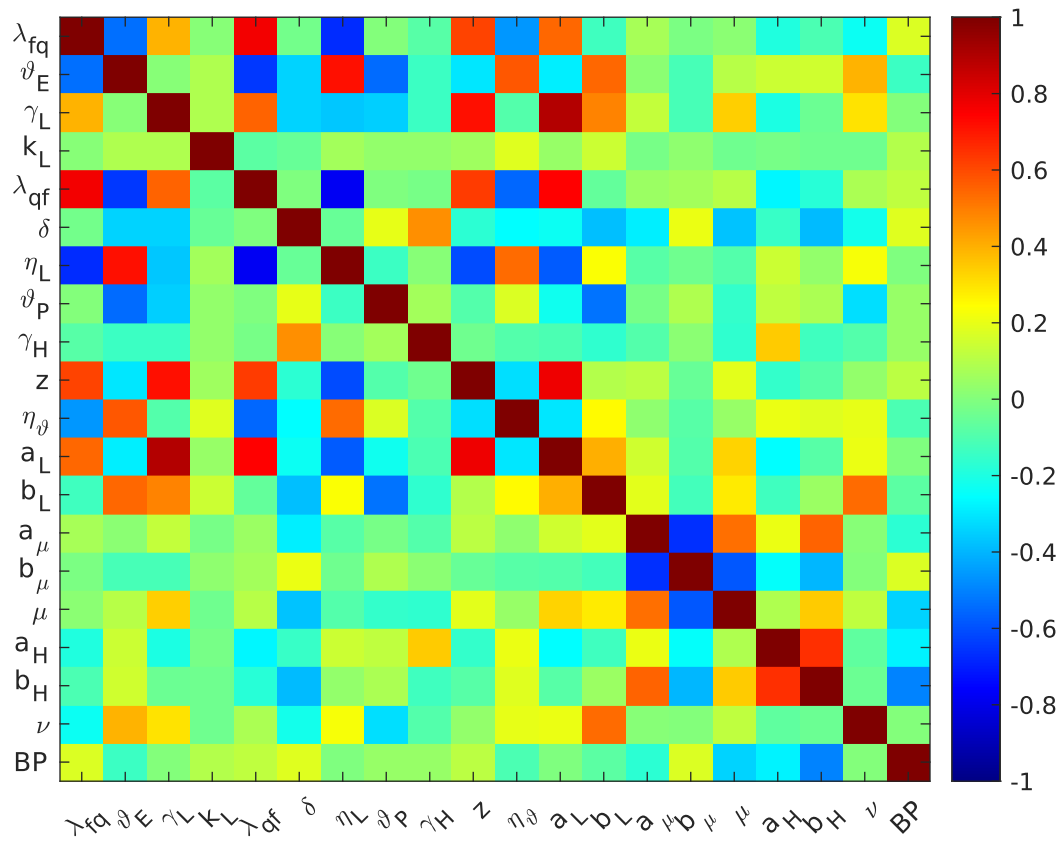
### 3.2. Estimated parameters with their intervals

It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

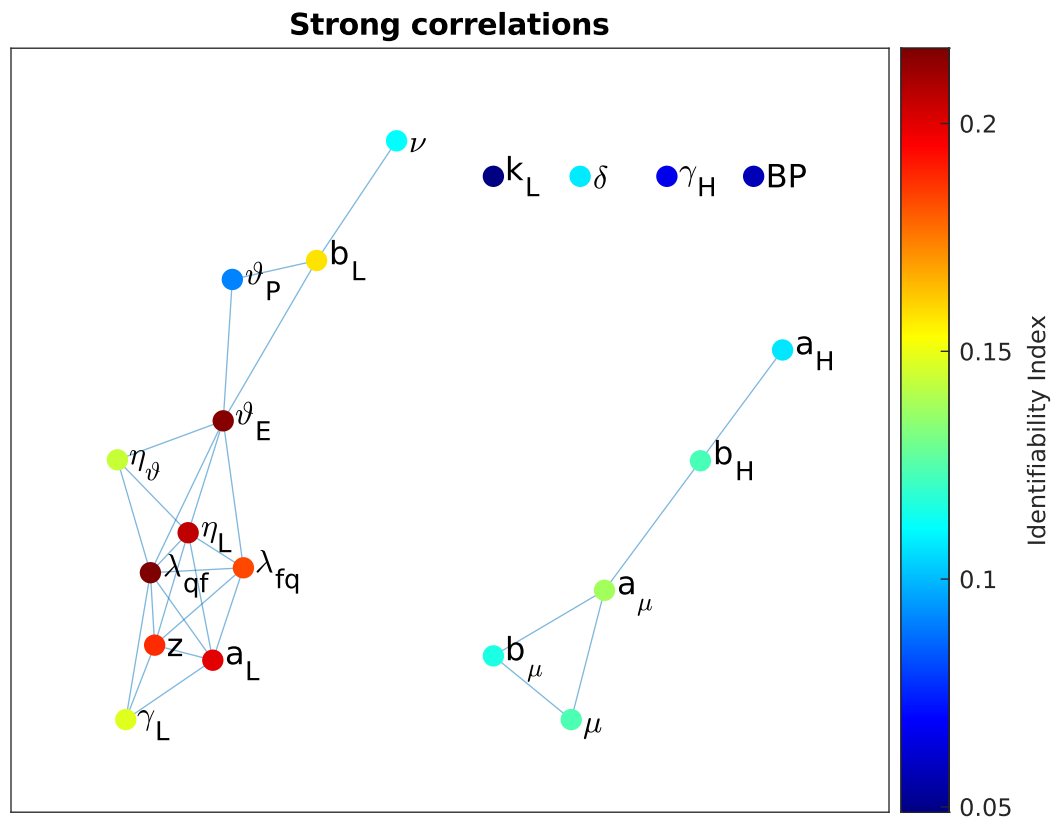
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.1019'	'0.1682'	'0.1351'	'0.0606'	'0.1836'
$\vartheta_E$	'0.1593'	'0.2438'	'0.2015'	'0.7571'	'0.2146'
$\gamma_L$	'0.1308'	'0.164'	'0.1474'	'0.1448'	'0.1483'
$k_L$	'5.4159'	'5.5842'	'5.5'	'5.4859'	'0.0488'
$\lambda_{qf}$	'0.2646'	'0.3299'	'0.2972'	'0.2522'	'0.2165'
$\delta$	'0.0133'	'0.022'	'0.0176'	'0.0005'	'0.1079'
$\eta_L$	'0.5996'	'0.6774'	'0.6385'	'0.8345'	'0.206'
$\vartheta_P$	'0.0032'	'0.0062'	'0.0047'	'0.0005'	'0.0912'
$\gamma_H$	'0.1636'	'0.1898'	'0.1767'	'0.1405'	'0.0661'
$z$	'1.2715'	'3.4251'	'2.3483'	'0.8035'	'0.1878'
$\eta_{\vartheta}$	'0.7485'	'0.7964'	'0.7725'	'0.8081'	'0.1442'
$a_L$	'2.215'	'3.1785'	'2.6967'	'1.48'	'0.2001'
$b_L$	'5.1761'	'6.156'	'5.666'	'5.5148'	'0.1577'
$a_{\mu}$	'11.3813'	'12.3157'	'11.8485'	'9.0858'	'0.1382'
$b_{\mu}$	'1.5455'	'2.3128'	'1.9291'	'1.1056'	'0.1157'
$\mu$	'0.2142'	'0.257'	'0.2356'	'0.3659'	'0.1241'
$a_H$	'5.9056'	'6.5182'	'6.2119'	'3.9315'	'0.1076'
$b_H$	'6.1011'	'6.7328'	'6.417'	'3.4033'	'0.123'
$\nu$	'258.7541'	'293.8392'	'276.2966'	'494.473'	'0.1115'
BP	'139.4123'	'139.5877'	'139.5'	'140.5'	'0.058'

### 3.3. Identifiability analysys

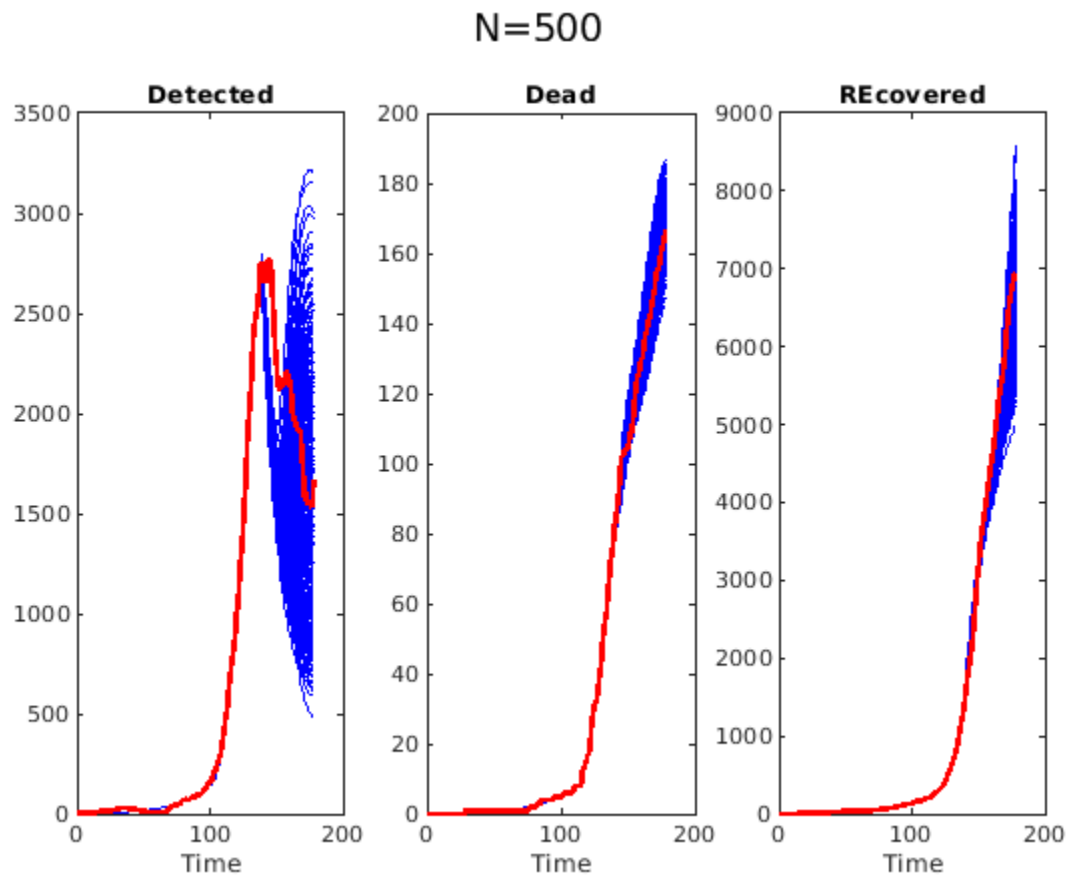








### 3.4. Uncertainty analysis



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## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data179 to the 204. The status of the validation is: COMPLETED.

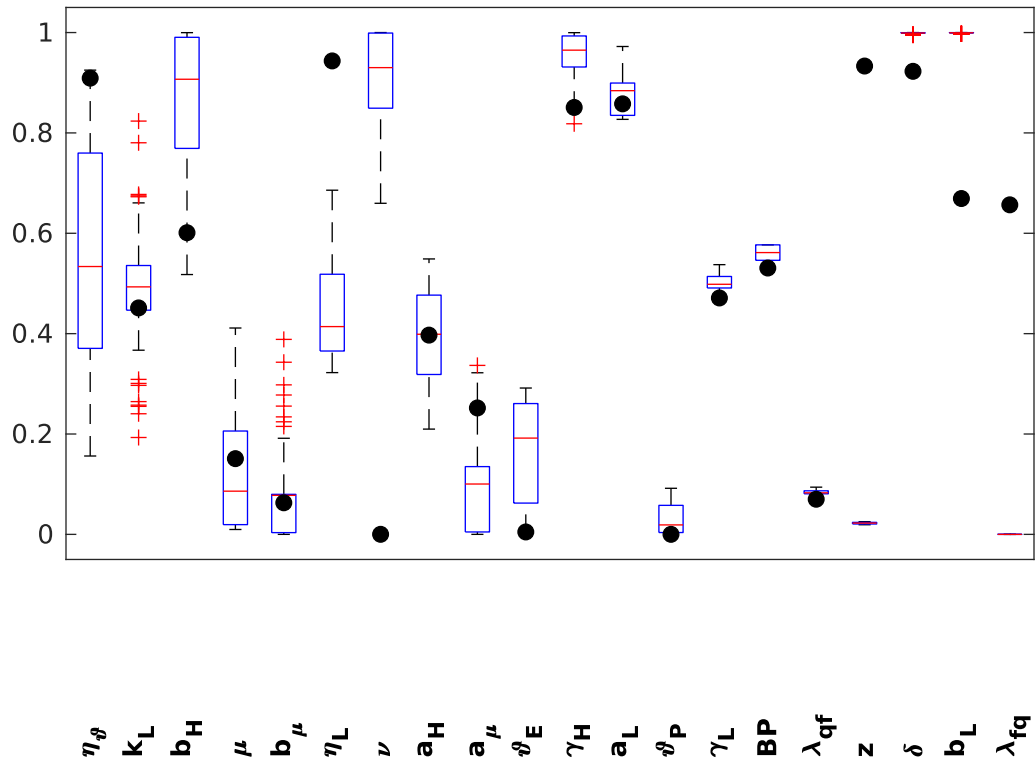
The number of estimations needed to perform the validation was1000.

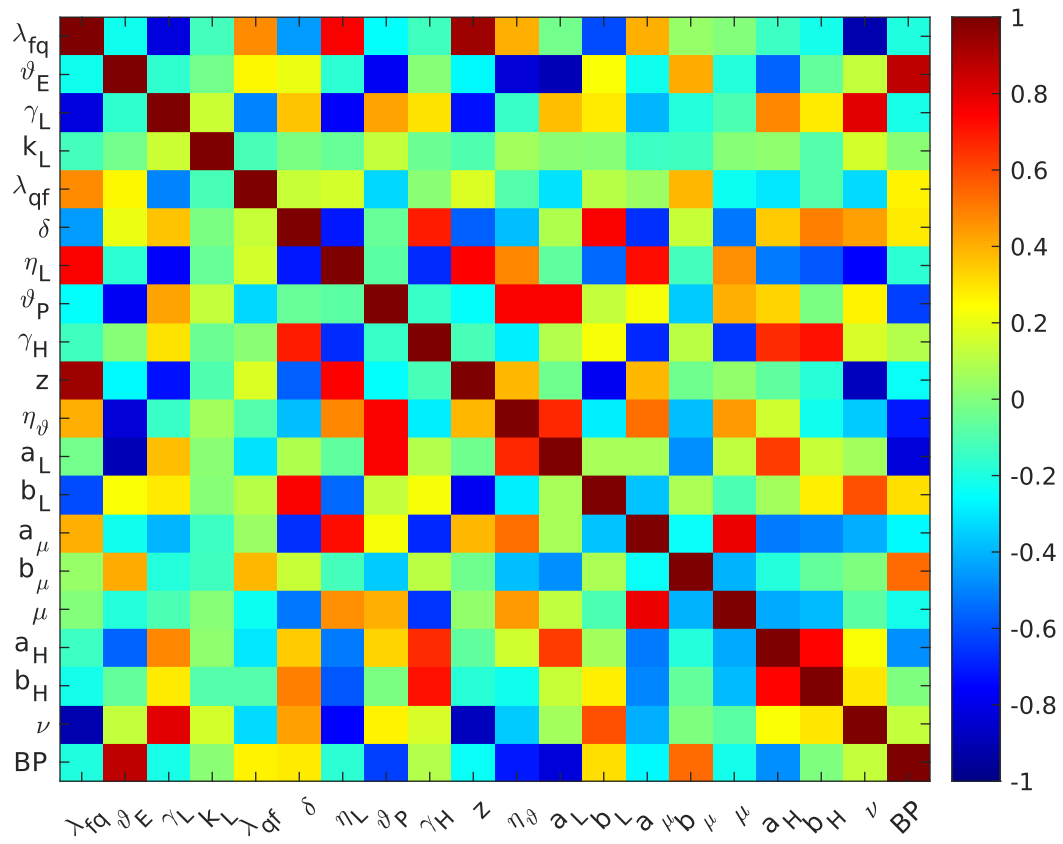
### 4.2. Estimated parameters with their intervals

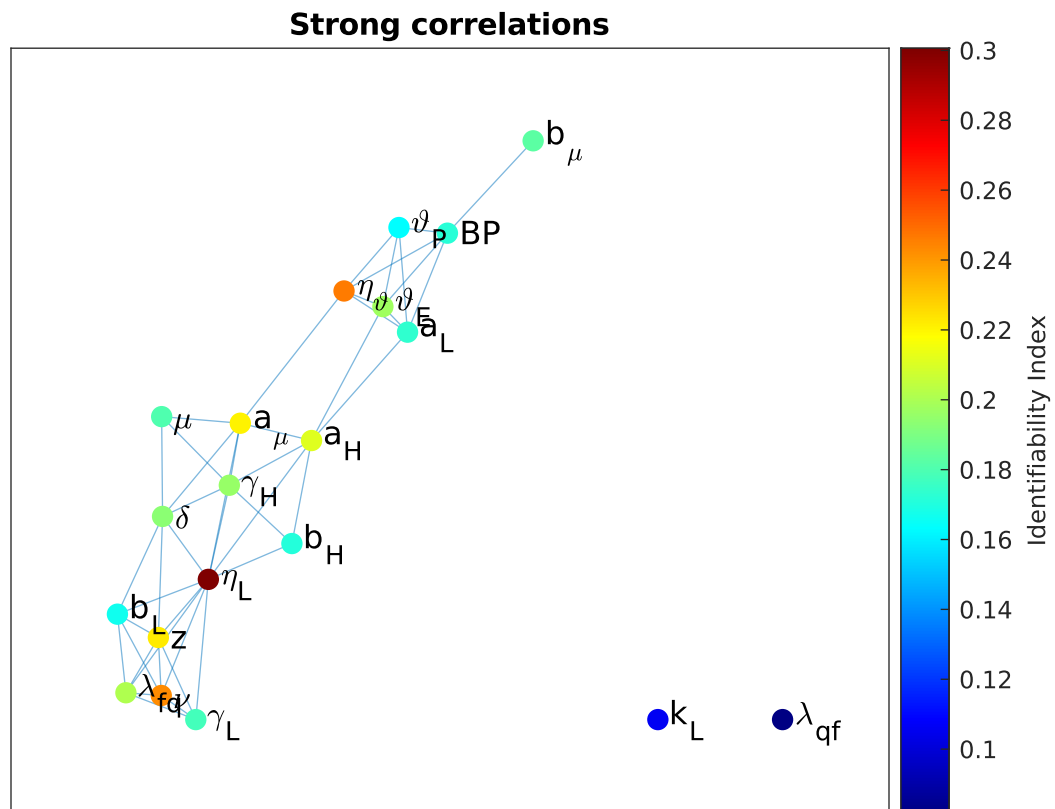
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0505'	'0'	'0.6567'	'0.2014'
$\vartheta_E$	'0.1625'	'0.2212'	'0.1919'	'0.0048'	'0.198'
$\gamma_L$	'0.4887'	'0.508'	'0.4983'	'0.4711'	'0.178'
$k_L$	'4.8654'	'6.0122'	'5.4388'	'5.0614'	'0.1061'
$\lambda_{qf}$	'0.08'	'0.0856'	'0.0828'	'0.07'	'0.0819'
$\delta$	'0.1492'	'0.15'	'0.1499'	'0.1384'	'0.1937'
$\eta_L$	'0.37'	'0.4583'	'0.4142'	'0.9435'	'0.3006'
$\vartheta_P$	'0.0093'	'0.0288'	'0.0191'	'0.0001'	'0.1634'
$\gamma_H$	'0.9417'	'0.9876'	'0.9647'	'0.8507'	'0.1958'
$z$	'0'	'2.1794'	'0.6753'	'27.9982'	'0.2223'
$\eta_{\vartheta}$	'0.4691'	'0.5984'	'0.5338'	'0.9091'	'0.2467'
$a_L$	'13.1763'	'13.5808'	'13.3785'	'13.0109'	'0.1737'
$b_L$	'14.8231'	'15'	'14.9925'	'10.3694'	'0.167'
$a_{\mu}$	'2.0345'	'2.775'	'2.4048'	'4.5269'	'0.2208'
$b_{\mu}$	'1'	'3.5769'	'2.1173'	'1.8815'	'0.1831'
$\mu$	'0.043'	'0.1398'	'0.0914'	'0.1509'	'0.1802'
$a_H$	'6.2238'	'6.9426'	'6.5832'	'6.5589'	'0.211'
$b_H$	'13.1129'	'14.2815'	'13.6972'	'9.4158'	'0.1708'
$\nu$	'430.9167'	'498.943'	'464.9298'	'0.0571'	'0.2428'
BP	'175.2468'	'175.7532'	'175.5'	'173.5'	'0.1717'

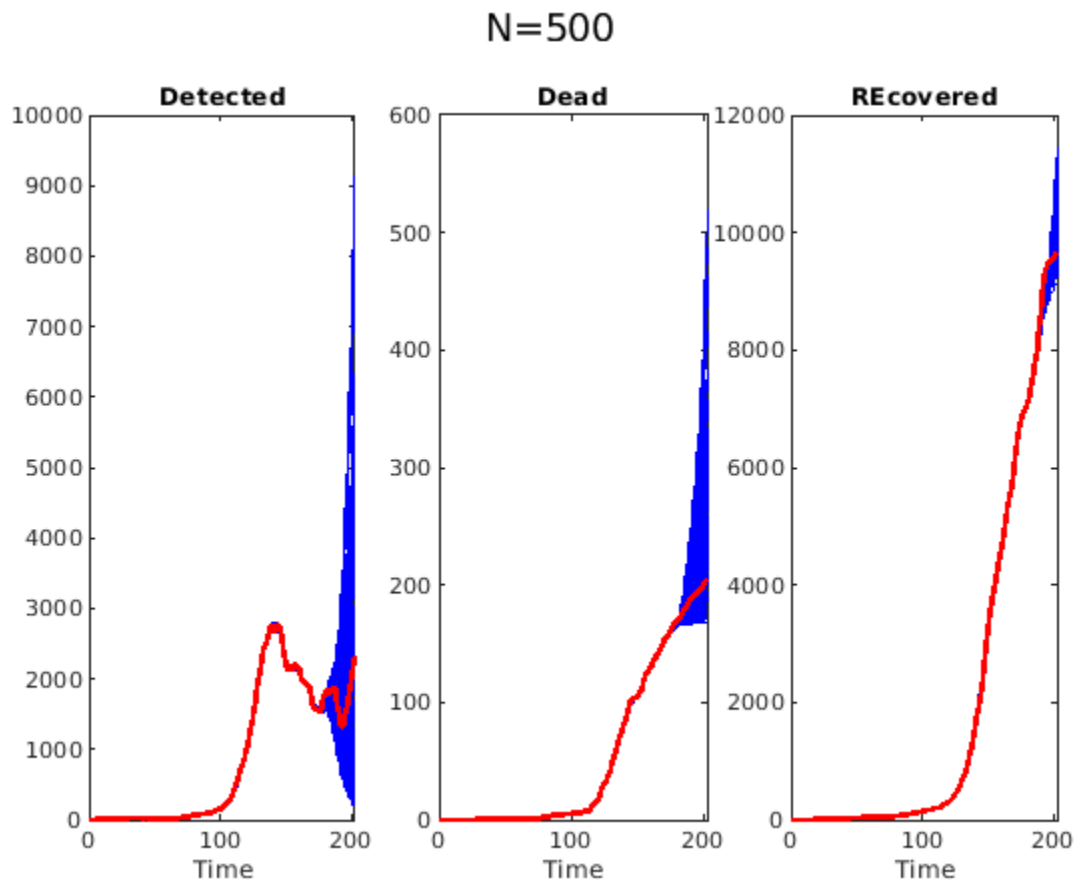
### 4.3. Identifiability analysis







#### 4.4. Uncertainty analysys



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## Chapter 5. Extension number5

### 5.1. Basic information

The extension to be validated consists of the time series from the data204 to the 253. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

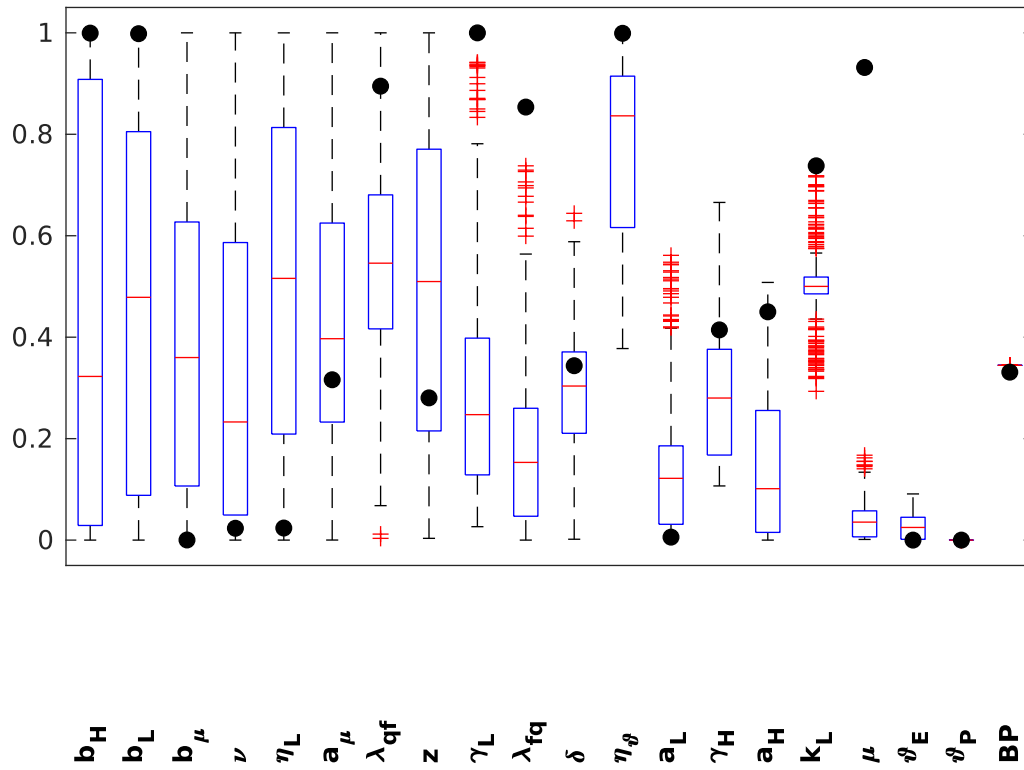
### 5.2. Estimated parameters with their intervals

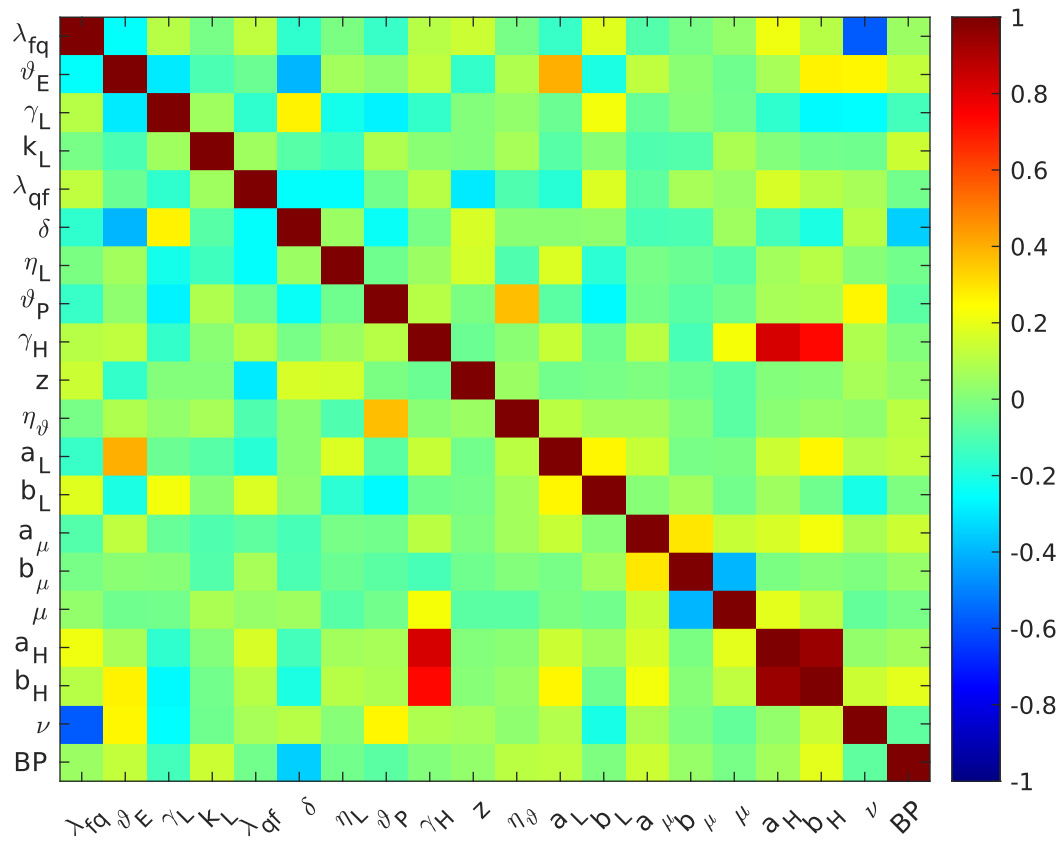
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

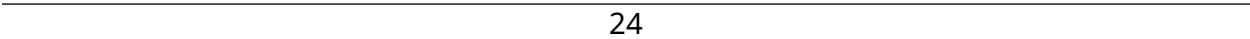
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.1127'	'0.1936'	'0.1532'	'0.8536'	'0.1092'
$\vartheta_E$	'0.0217'	'0.0282'	'0.0249'	'0'	'0.0665'
$\gamma_L$	'0.2003'	'0.2943'	'0.2473'	'0.9999'	'0.106'
$k_L$	'5.2736'	'5.7287'	'5.5012'	'7.6406'	'0.0653'
$\lambda_{qf}$	'0.5142'	'0.5776'	'0.5459'	'0.8949'	'0.0858'
$\delta$	'0.0429'	'0.0482'	'0.0456'	'0.0516'	'0.0767'
$\eta_L$	'0.4711'	'0.5608'	'0.5159'	'0.0238'	'0.092'
$\vartheta_P$	'0'	'0.0001'	'0'	'0'	'0.0536'
$\gamma_H$	'0.2602'	'0.2999'	'0.2801'	'0.4144'	'0.1078'
$z$	'13.9492'	'16.6323'	'15.2908'	'8.4119'	'0.0862'
$\eta_{\vartheta}$	'0.8089'	'0.8638'	'0.8364'	'0.9991'	'0.07'
$a_L$	'2.2772'	'3.1322'	'2.7047'	'1.0818'	'0.0862'
$b_L$	'7.0022'	'8.3983'	'7.7003'	'14.9763'	'0.1002'
$a_{\mu}$	'6.0175'	'7.099'	'6.5582'	'5.425'	'0.0883'
$b_{\mu}$	'5.4275'	'6.6489'	'6.0382'	'1.0033'	'0.0864'
$\mu$	'0.0071'	'0.0638'	'0.0354'	'0.9317'	'0.0749'
$a_H$	'2.1611'	'2.6767'	'2.4189'	'7.3002'	'0.1101'
$b_H$	'4.7223'	'6.3115'	'5.5169'	'14.9922'	'0.1552'
$\nu$	'94.3517'	'138.544'	'116.4478'	'11.6673'	'0.1123'
BP	'204.3469'	'204.653'	'204.5'	'203.4999'	'0.0485'



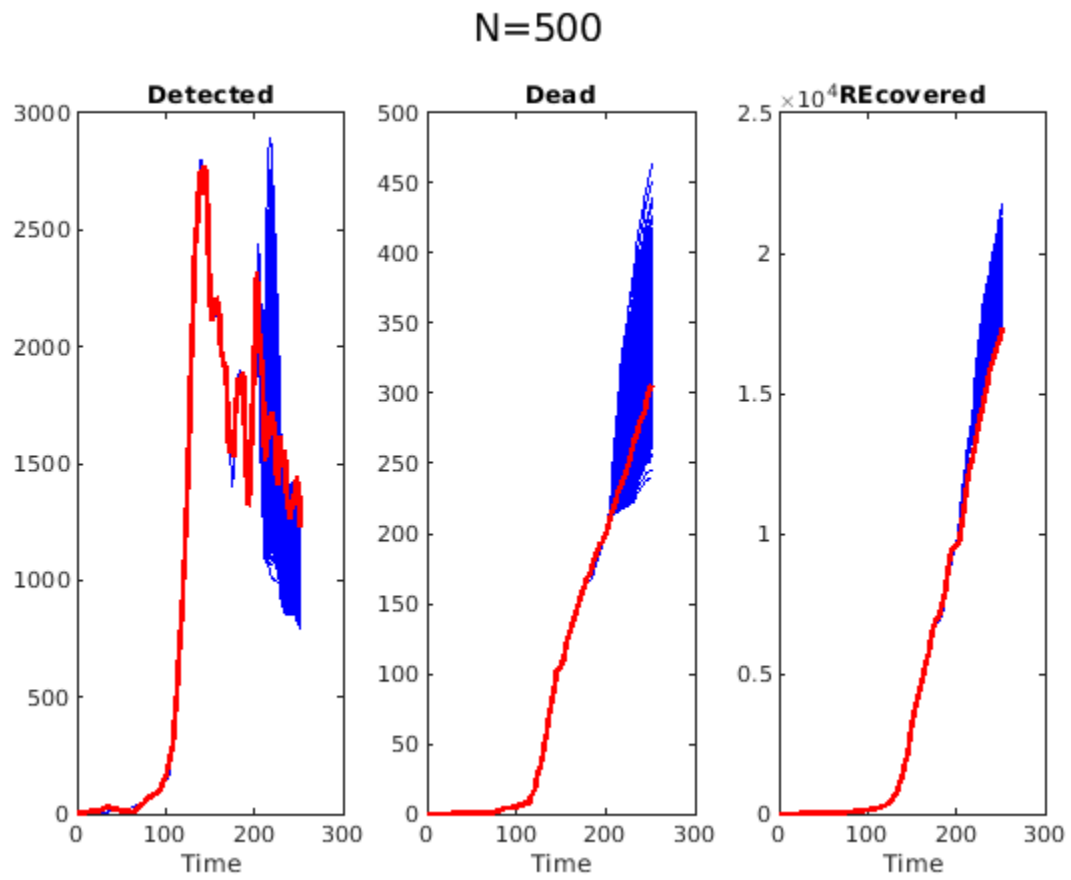
### 5.3. Identifiability analysys







## 5.4. Uncertainty analysis



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## Chapter 6. Extension number6

### 6.1. Basic information

The extension to be validated consists of the time series from the data253 to the 294. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

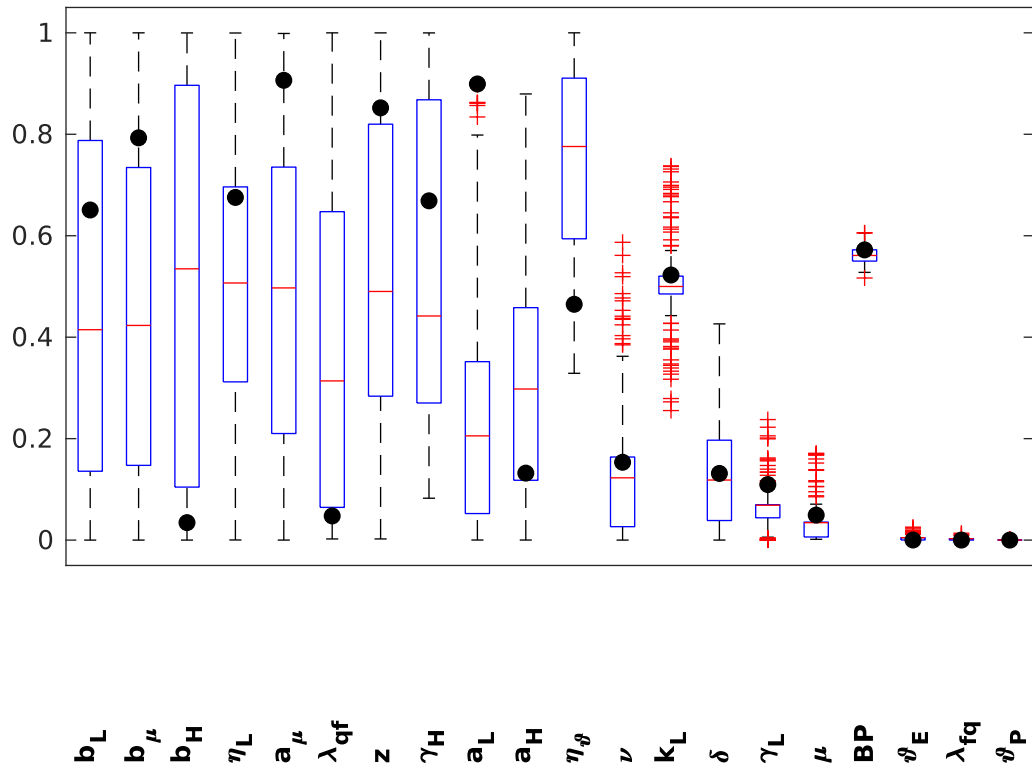
### 6.2. Estimated parameters with their intervals

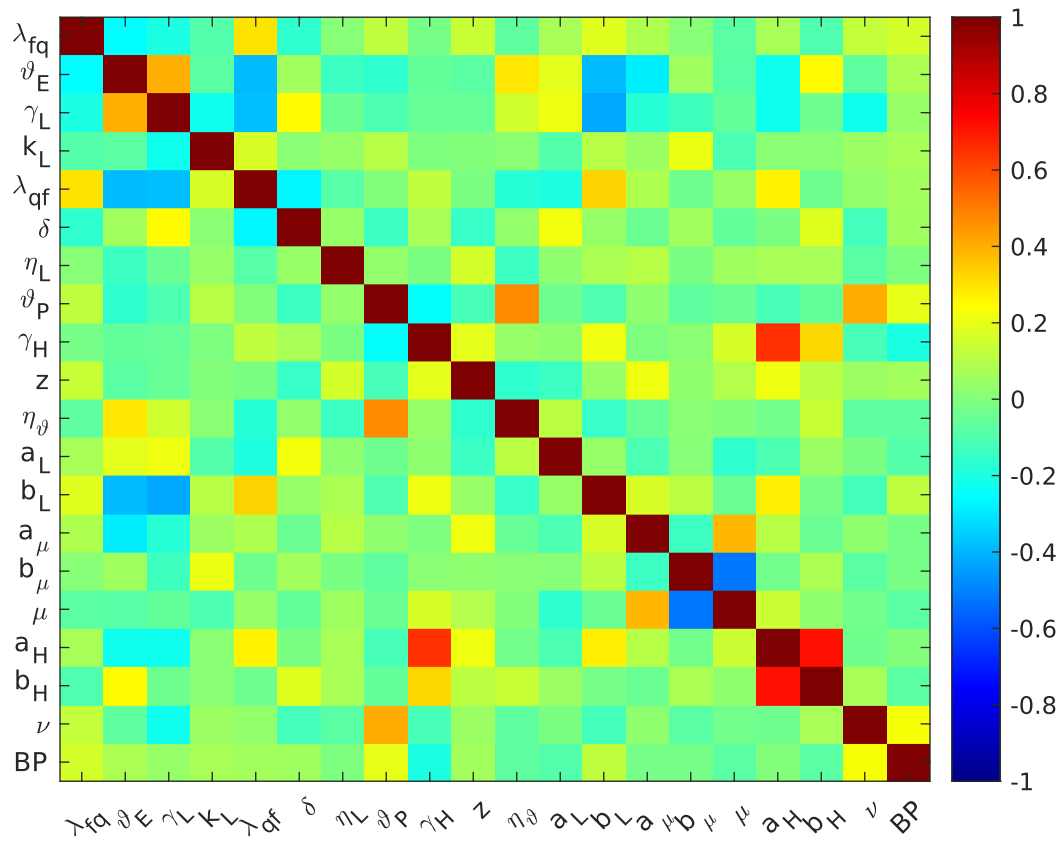
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

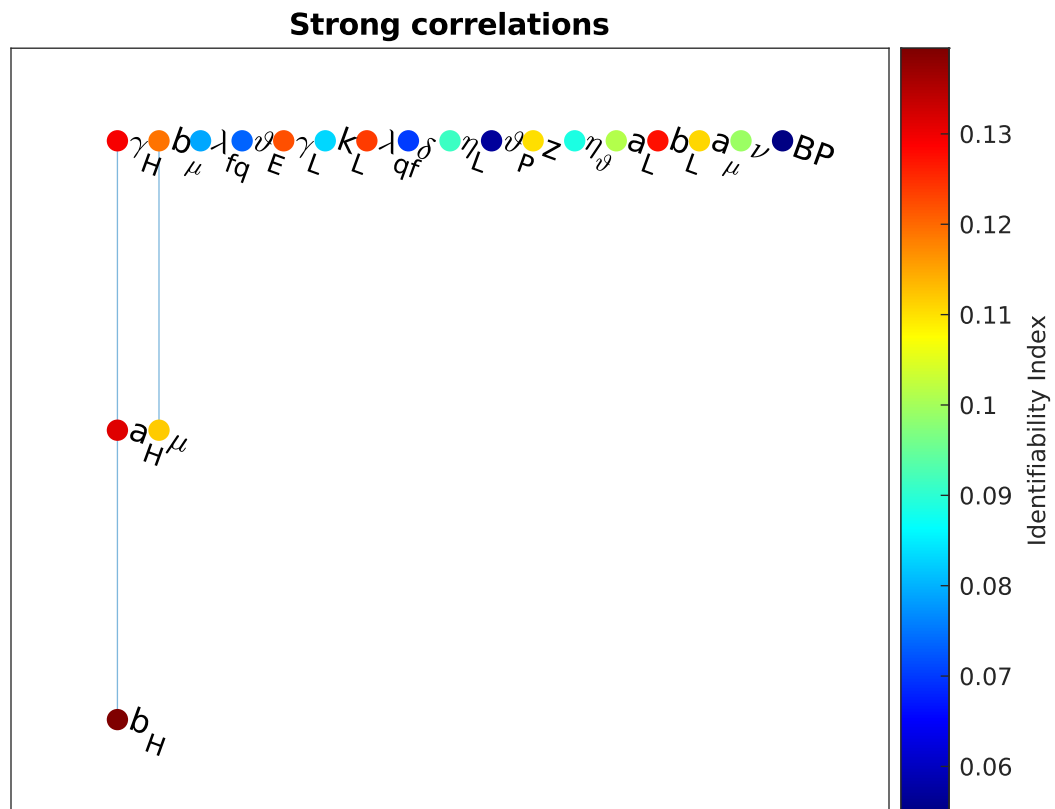
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0001'	'0.0029'	'0.0001'	'0.0793'
$\vartheta_E$	'0'	'0.0004'	'0.0048'	'0.0002'	'0.0736'
$\gamma_L$	'0.0675'	'0.1102'	'0.069'	'0.1095'	'0.1221'
$k_L$	'1.18'	'10'	'5.4996'	'5.7031'	'0.0831'
$\lambda_{qf}$	'0'	'0.1028'	'0.3138'	'0.0476'	'0.1238'
$\delta$	'0.0044'	'0.0428'	'0.0178'	'0.0197'	'0.0704'
$\eta_L$	'0'	'1'	'0.5068'	'0.6755'	'0.0916'
$\vartheta_P$	'0'	'0'	'0.0001'	'0'	'0.0571'
$\gamma_H$	'0.2304'	'1'	'0.4418'	'0.6688'	'0.1295'
$z$	'0.6'	'30'	'14.7045'	'25.5629'	'0.1102'
$\eta_{\vartheta}$	'0.4394'	'0.4665'	'0.7759'	'0.4648'	'0.0888'
$a_L$	'6.9976'	'14.212'	'3.8924'	'13.5887'	'0.1014'
$b_L$	'6.6932'	'15'	'6.8061'	'10.1103'	'0.1273'
$a_{\mu}$	'8.6163'	'15'	'7.9598'	'13.69'	'0.1108'
$b_{\mu}$	'1.28'	'14.4512'	'6.9246'	'12.102'	'0.1193'
$\mu$	'0.0028'	'0.111'	'0.0355'	'0.0493'	'0.1121'
$a_H$	'2.0003'	'4.1503'	'5.1699'	'2.8485'	'0.1314'
$b_H$	'1.4249'	'7.1574'	'8.487'	'1.4821'	'0.1395'
$\nu$	'67.599'	'500'	'61.5298'	'76.7121'	'0.0993'
BP	'255.142'	'262.5939'	'254.5'	'255.4873'	'0.0549'

### 6.3. Identifiability analysis

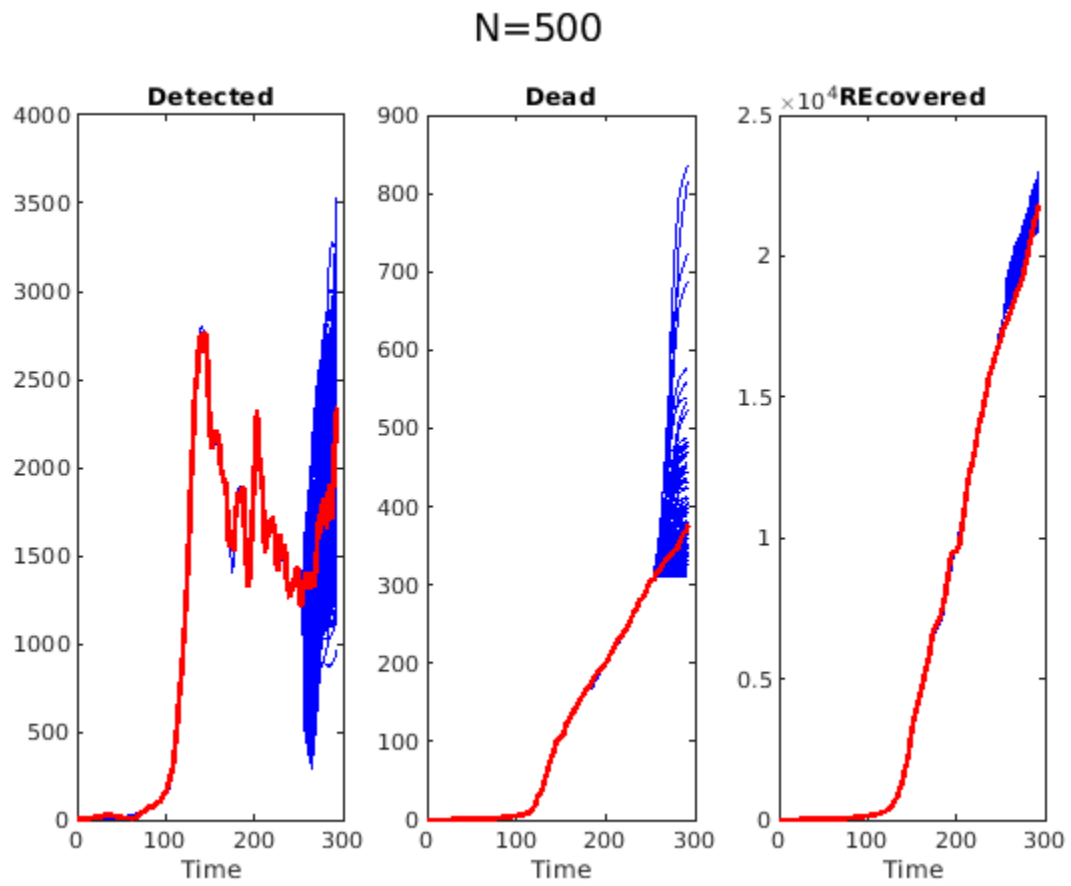








## 6.4. Uncertainty analysis



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## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data294 to the 319. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

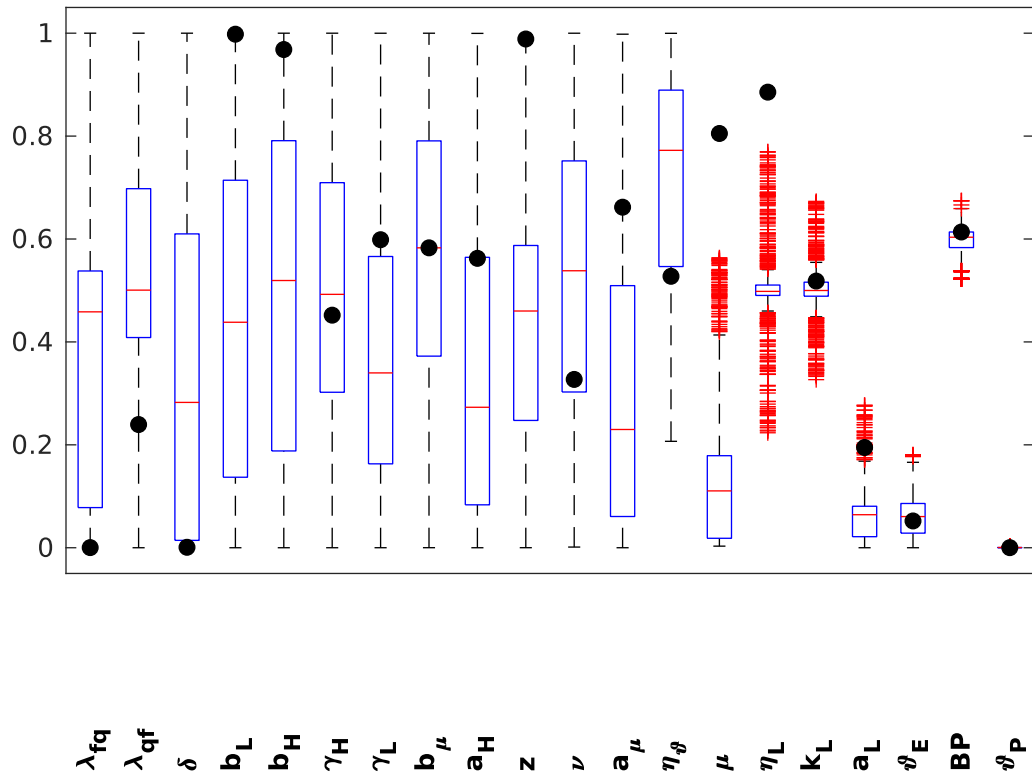
### 7.2. Estimated parameters with their intervals

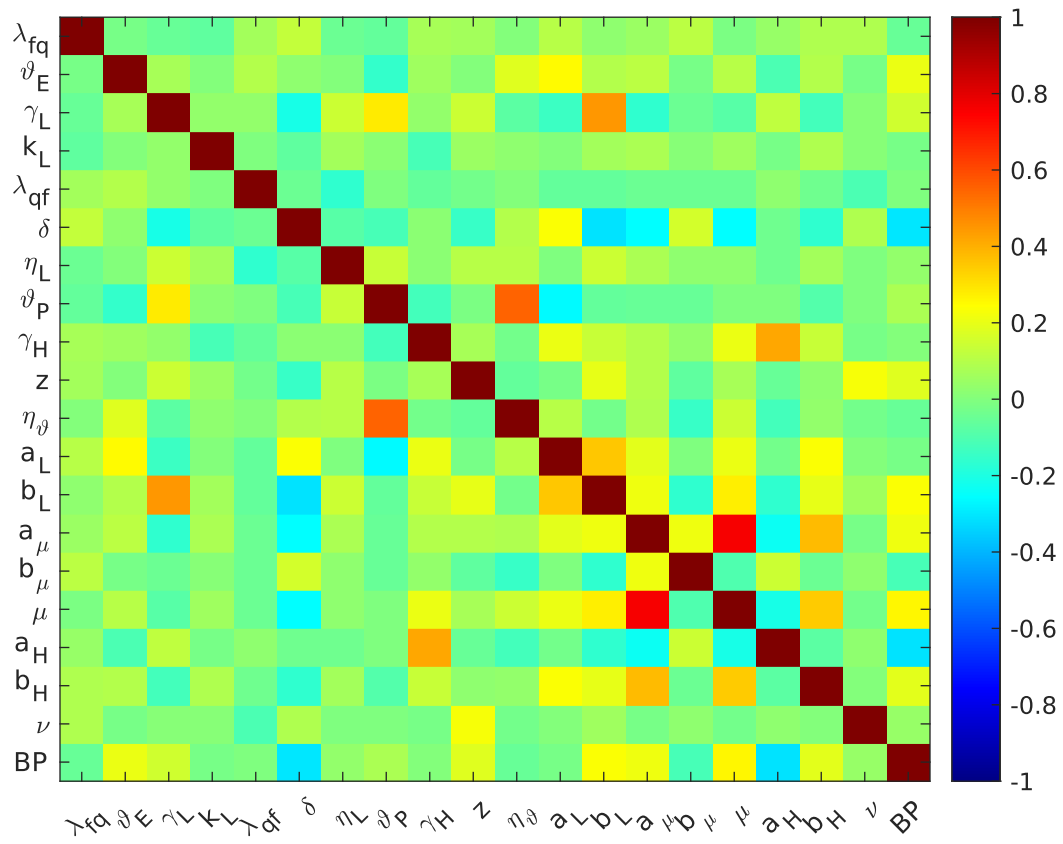
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

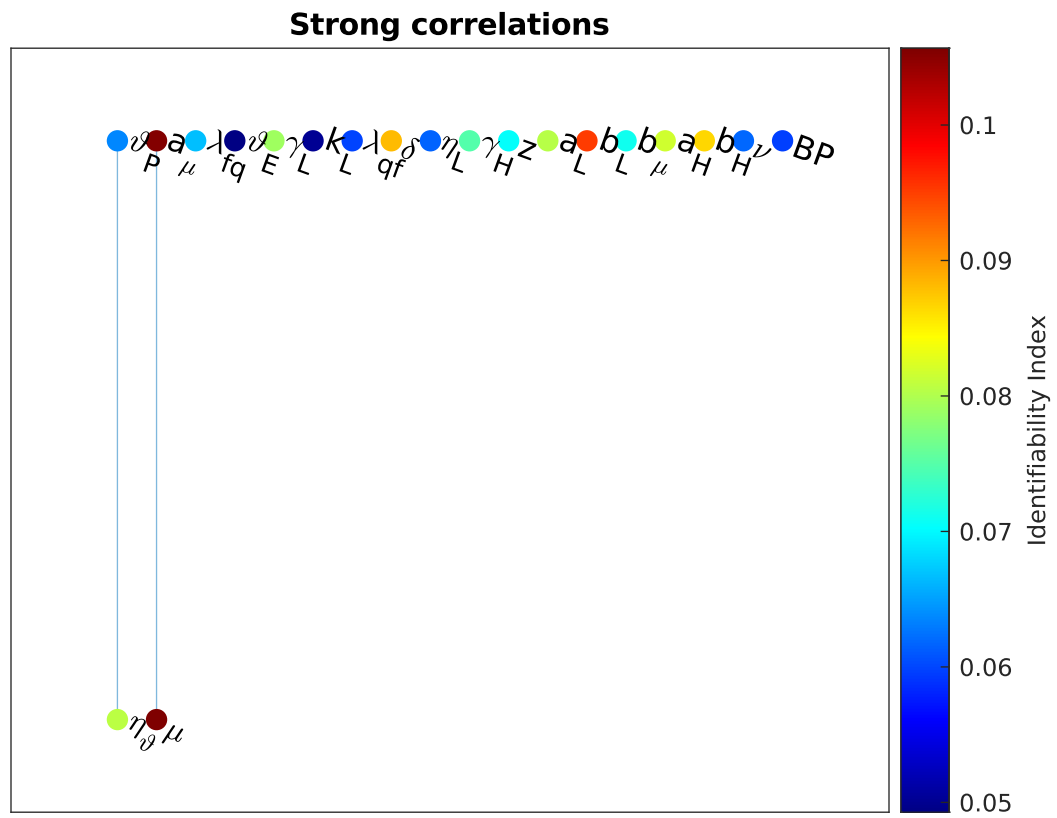
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0006'	'0.4584'	'0.0003'	'0.0668'
$\vartheta_E$	'0.0384'	'0.1139'	'0.0606'	'0.052'	'0.0493'
$\gamma_L$	'0.338'	'0.8597'	'0.3398'	'0.5986'	'0.0792'
$k_L$	'1.18'	'10'	'5.4995'	'5.6642'	'0.0502'
$\lambda_{qf}$	'0'	'0.5118'	'0.5006'	'0.2394'	'0.0599'
$\delta$	'0'	'0.0003'	'0.0424'	'0.0001'	'0.0882'
$\eta_L$	'0'	'1'	'0.4982'	'0.8854'	'0.0616'
$\vartheta_P$	'0.0001'	'0.0005'	'0.0004'	'0.0001'	'0.0636'
$\gamma_H$	'0.1285'	'1'	'0.4924'	'0.452'	'0.075'
$z$	'0'	'30'	'13.8021'	'29.6611'	'0.0706'
$\eta_{\vartheta}$	'0.5236'	'0.6322'	'0.7723'	'0.5275'	'0.0807'
$a_L$	'2.4422'	'10.053'	'1.8985'	'3.7272'	'0.0804'
$b_L$	'8.3704'	'15'	'7.1352'	'14.9727'	'0.0953'
$a_{\mu}$	'8.5352'	'14.7414'	'4.2174'	'10.2657'	'0.1053'
$b_{\mu}$	'1'	'11.2144'	'9.1599'	'9.1599'	'0.0713'
$\mu$	'0'	'0.8405'	'0.1105'	'0.8051'	'0.1057'
$a_H$	'1'	'13.768'	'4.8217'	'8.874'	'0.0819'
$b_H$	'5.9799'	'15'	'8.2707'	'14.5556'	'0.0867'
$\nu$	'121.1924'	'466.2226'	'269.1524'	'163.5614'	'0.0618'
BP	'293.4967'	'299.0329'	'292.8298'	'293.5'	'0.0598'

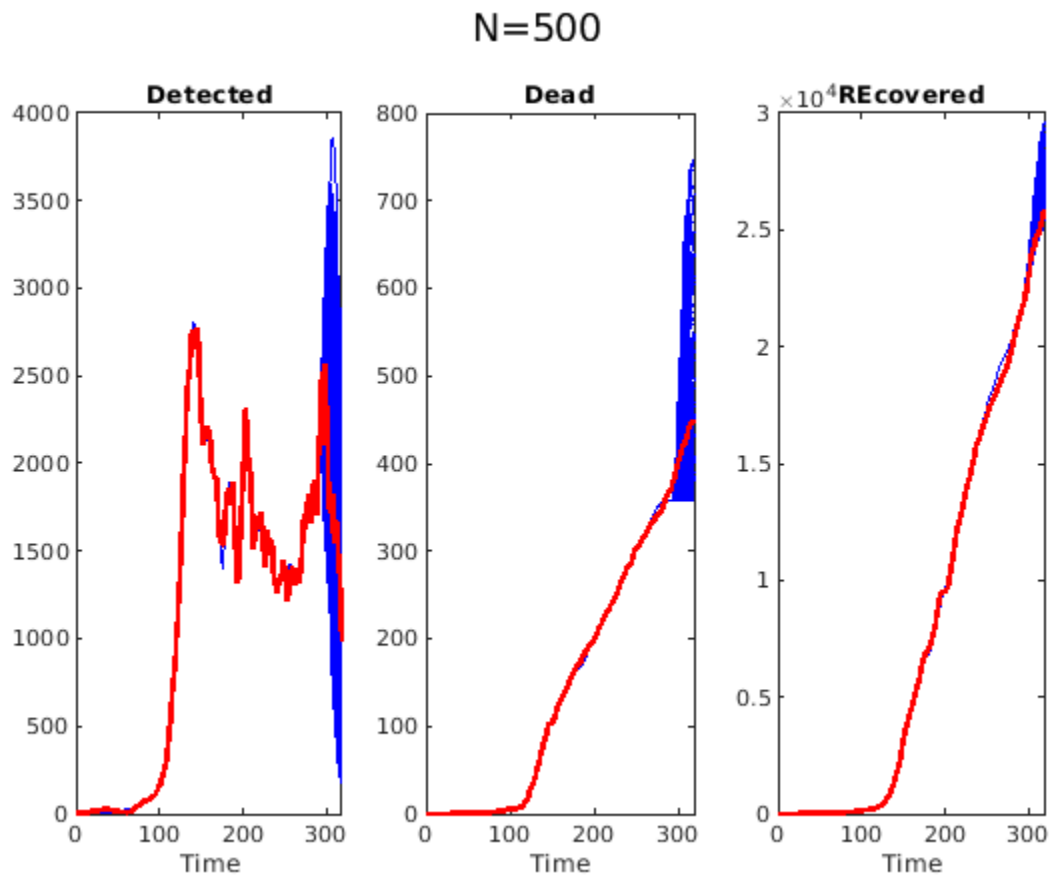
### 7.3. Identifiability analysis







## 7.4. Uncertainty analysis



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## Chapter 8. Extension number8

### 8.1. Basic information

The extension to be validated consists of the time series from the data319 to the 346. The status of the validation is: COMPLETED.

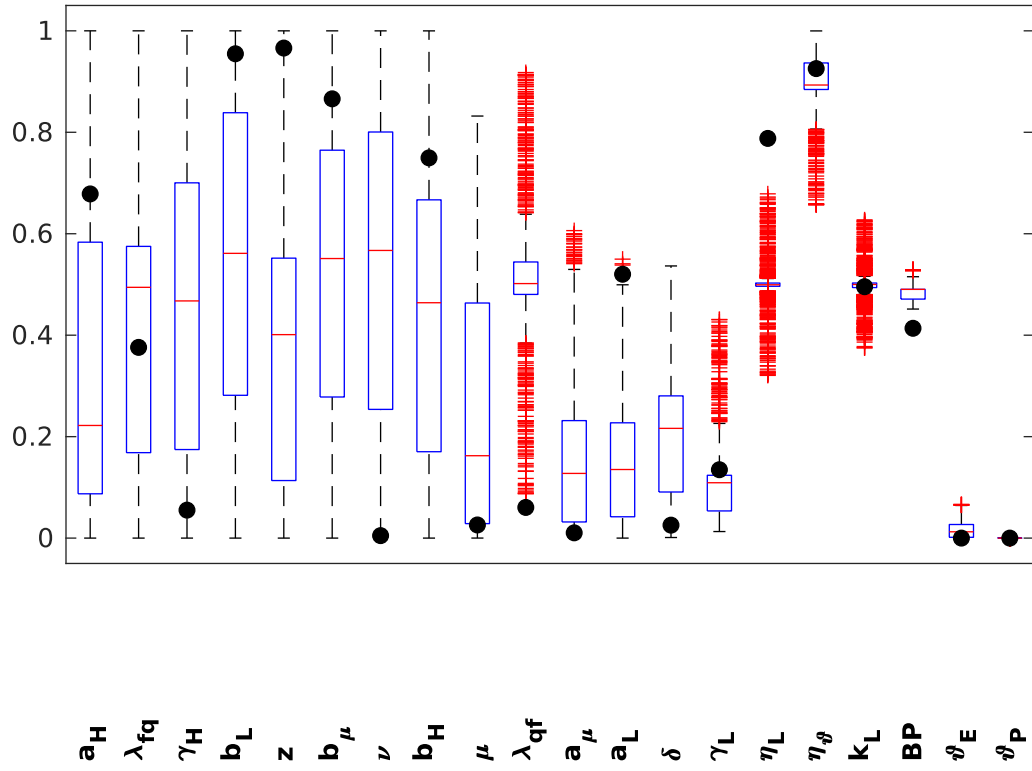
The number of estimations needed to perform the validation was1000.

### 8.2. Estimated parameters with their intervals

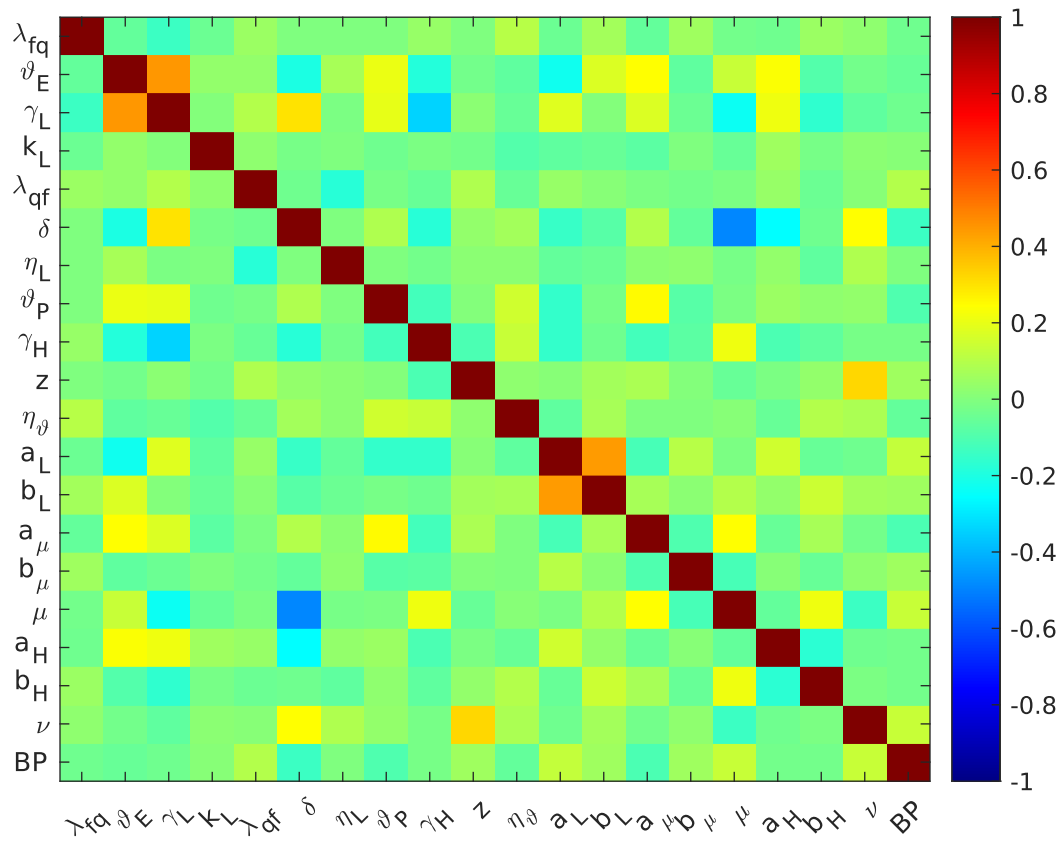
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

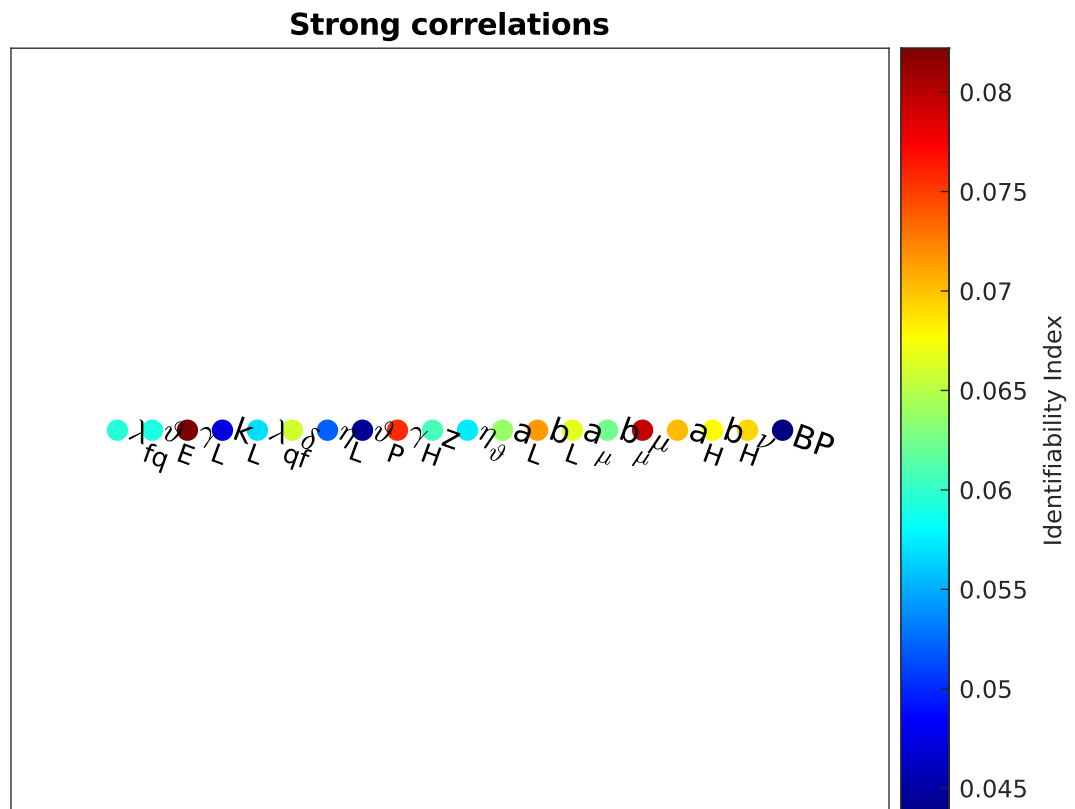
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.4704'	'0.5183'	'0.4944'	'0.376'	'0.0597'
$\vartheta_E$	'0.0105'	'0.0144'	'0.0124'	'0'	'0.0592'
$\gamma_L$	'0.086'	'0.1324'	'0.1092'	'0.1348'	'0.0822'
$k_L$	'5.3718'	'5.6269'	'5.4994'	'5.4599'	'0.0474'
$\lambda_{qf}$	'0.4816'	'0.5219'	'0.5017'	'0.0604'	'0.0569'
$\delta$	'0.031'	'0.034'	'0.0325'	'0.0038'	'0.066'
$\eta_L$	'0.4812'	'0.5175'	'0.4994'	'0.7879'	'0.0522'
$\vartheta_P$	'0'	'0.0001'	'0'	'0'	'0.0444'
$\gamma_H$	'0.442'	'0.4932'	'0.4676'	'0.0551'	'0.0757'
$z$	'11.3307'	'12.7355'	'12.0331'	'28.981'	'0.0609'
$\eta_{\vartheta}$	'0.876'	'0.91'	'0.893'	'0.9255'	'0.0573'
$a_L$	'2.7315'	'3.0565'	'2.894'	'8.2822'	'0.0639'
$b_L$	'8.4822'	'9.2349'	'8.8586'	'14.3668'	'0.0715'
$a_{\mu}$	'2.5406'	'3.0304'	'2.7855'	'1.1454'	'0.0666'
$b_{\mu}$	'8.3595'	'9.0714'	'8.7155'	'13.1234'	'0.0623'
$\mu$	'0.1364'	'0.1887'	'0.1625'	'0.0259'	'0.0796'
$a_H$	'3.7584'	'4.4588'	'4.1086'	'10.4987'	'0.0703'
$b_H$	'7.1505'	'7.8411'	'7.4958'	'11.4938'	'0.0676'
$\nu$	'270.3433'	'296.7165'	'283.5299'	'2.4374'	'0.0693'
BP	'319.3483'	'319.6457'	'319.497'	'315.5076'	'0.0438'

## 8.3. Identifiability analysis

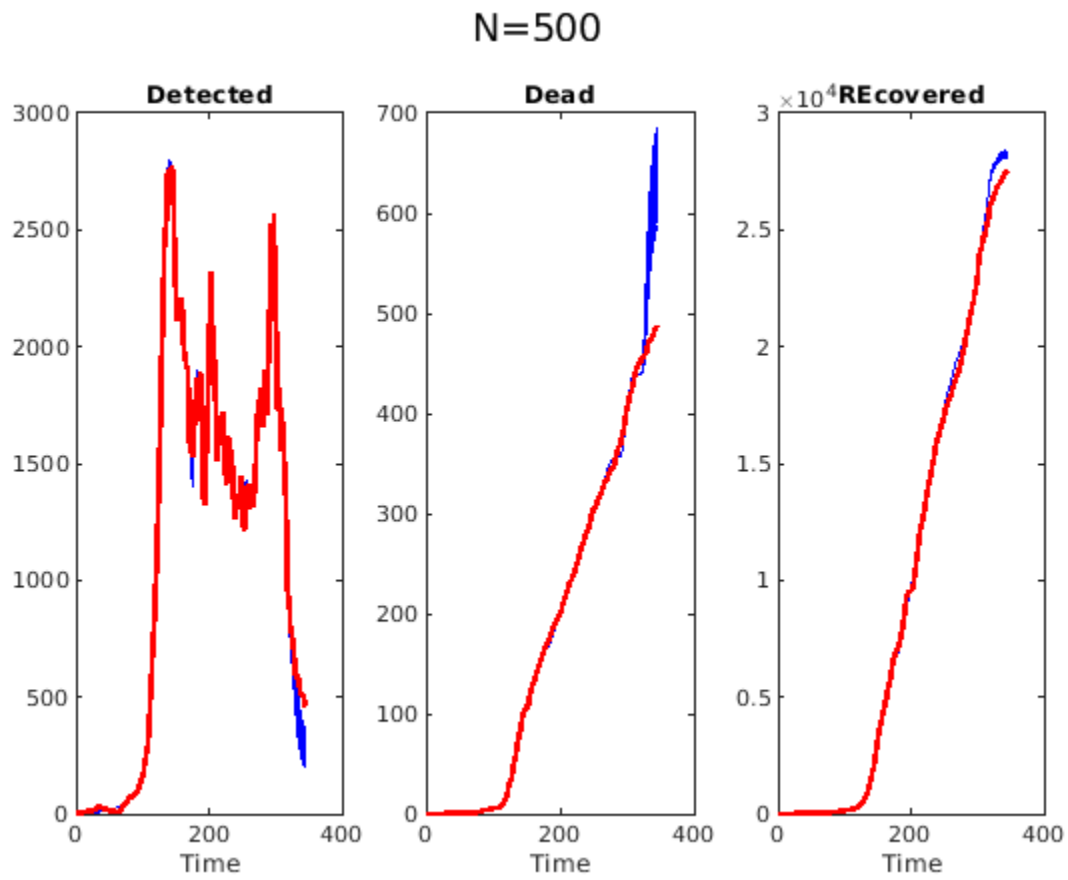








## 8.4. Uncertainty analysis



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## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data346 to the 378. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

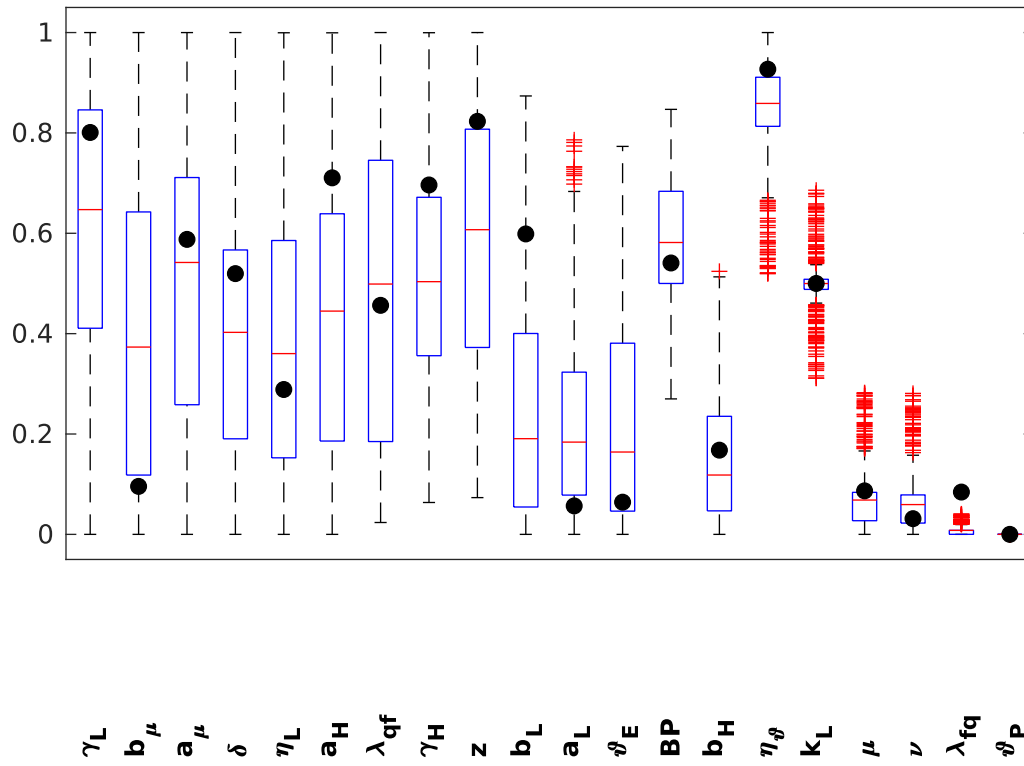
### 9.2. Estimated parameters with their intervals

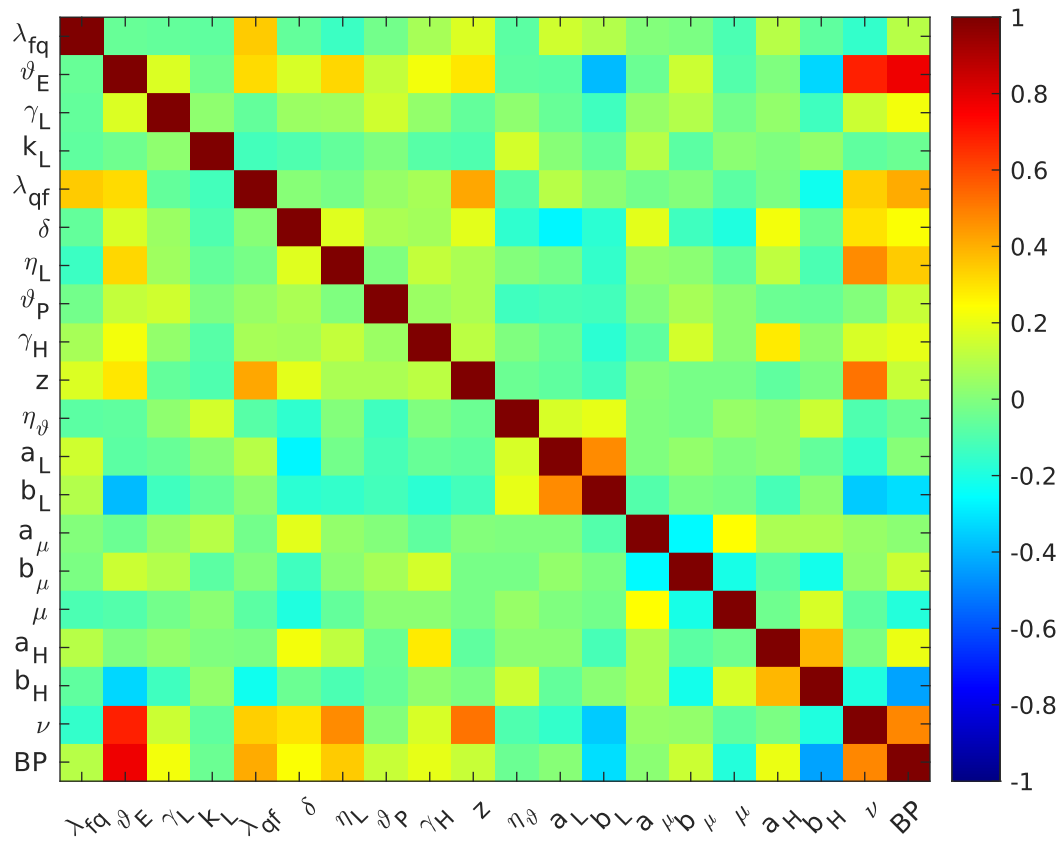
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

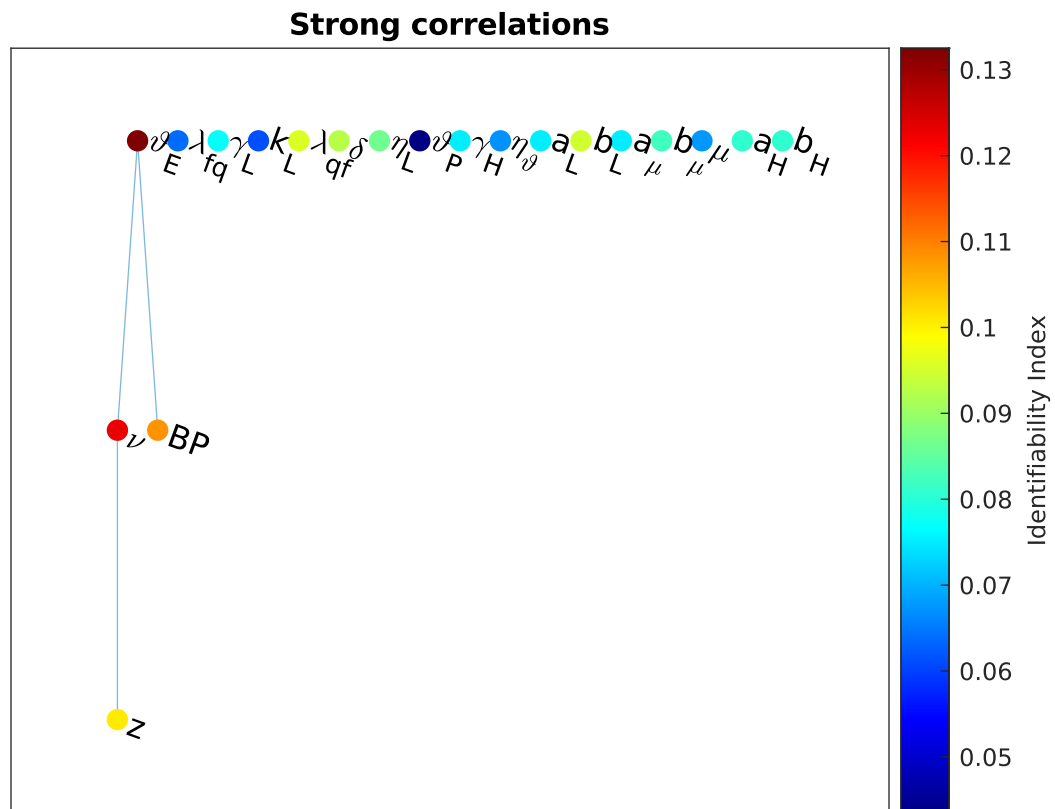
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0591'	'0.0967'	'0.008'	'0.0843'	'0.0638'
\vartheta_E	'0.0563'	'0.1153'	'0.1641'	'0.0642'	'0.1325'
\gamma_L	'0.0445'	'0.9045'	'0.6472'	'0.8009'	'0.0772'
k_L	'1.18'	'10'	'5.4988'	'5.4998'	'0.0613'
\lambda_{qf}	'0.453'	'0.5303'	'0.4988'	'0.4564'	'0.0959'
\delta	'0.0528'	'0.0865'	'0.0604'	'0.0779'	'0.0929'
\eta_L	'0.2831'	'0.3753'	'0.3602'	'0.2887'	'0.0866'
\vartheta_P	'0'	'0.0001'	'0.0001'	'0'	'0.0436'
\gamma_H	'0.1426'	'0.9571'	'0.5036'	'0.6963'	'0.0755'
z	'16.8143'	'24.8166'	'18.2143'	'24.6919'	'0.1007'
\eta_{\vartheta}	'0.7201'	'0.9626'	'0.8588'	'0.927'	'0.0674'
a_L	'1.1881'	'2.1839'	'3.5741'	'1.7942'	'0.0752'
b_L	'8.2676'	'12.2446'	'3.6697'	'9.3816'	'0.0947'
a_{\mu}	'5.8734'	'15'	'8.5858'	'9.23'	'0.0752'
b_{\mu}	'1'	'15'	'6.2255'	'2.3389'	'0.0823'
\mu	'0.0046'	'0.0888'	'0.0684'	'0.0867'	'0.0678'
a_H	'5.4195'	'14.6168'	'7.229'	'10.9468'	'0.0809'
b_H	'1.6042'	'12.2124'	'2.6557'	'3.3494'	'0.081'
\nu	'13.9232'	'16.5531'	'29.686'	'15.6397'	'0.1229'
BP	'345.4227'	'348.5389'	'347.5'	'345.4999'	'0.1085'

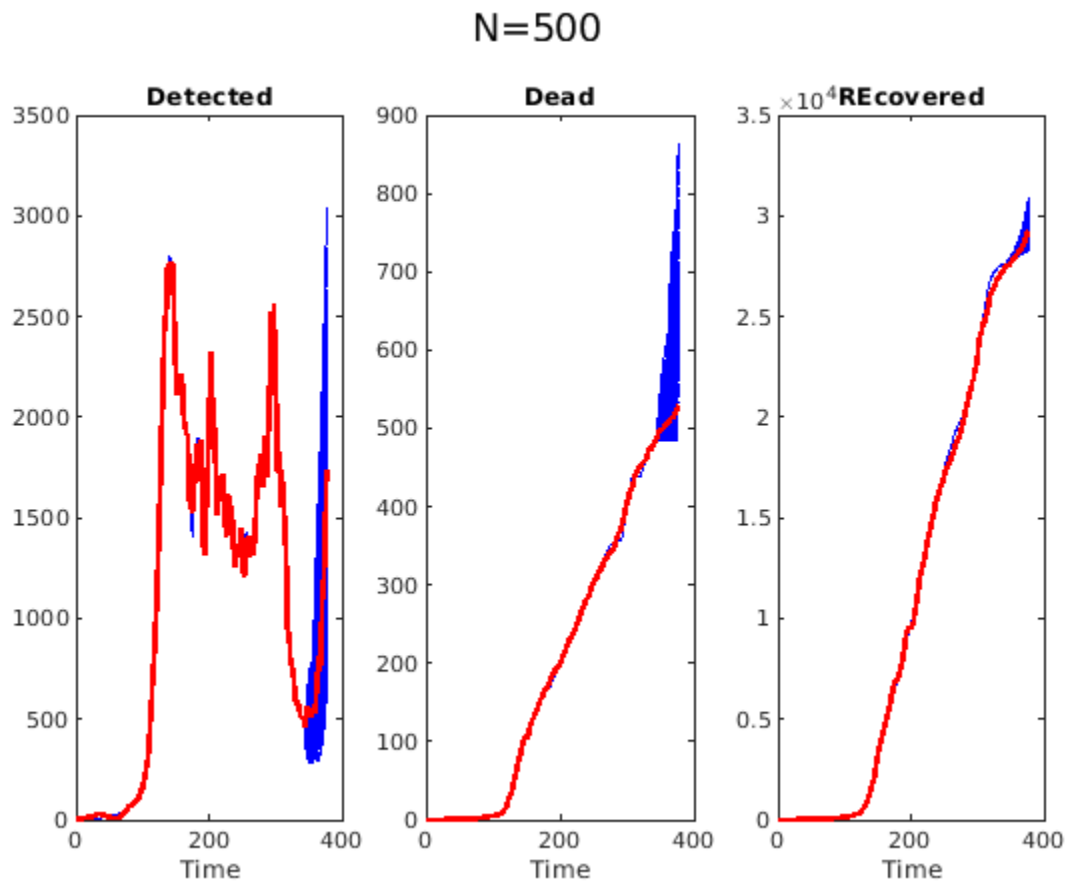
### 9.3. Identifiability analysis







## 9.4. Uncertainty analysis





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## Chapter 10. Extension number10

### 10.1. Basic information

The extension to be validated consists of the time series from the data378 to the 399. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

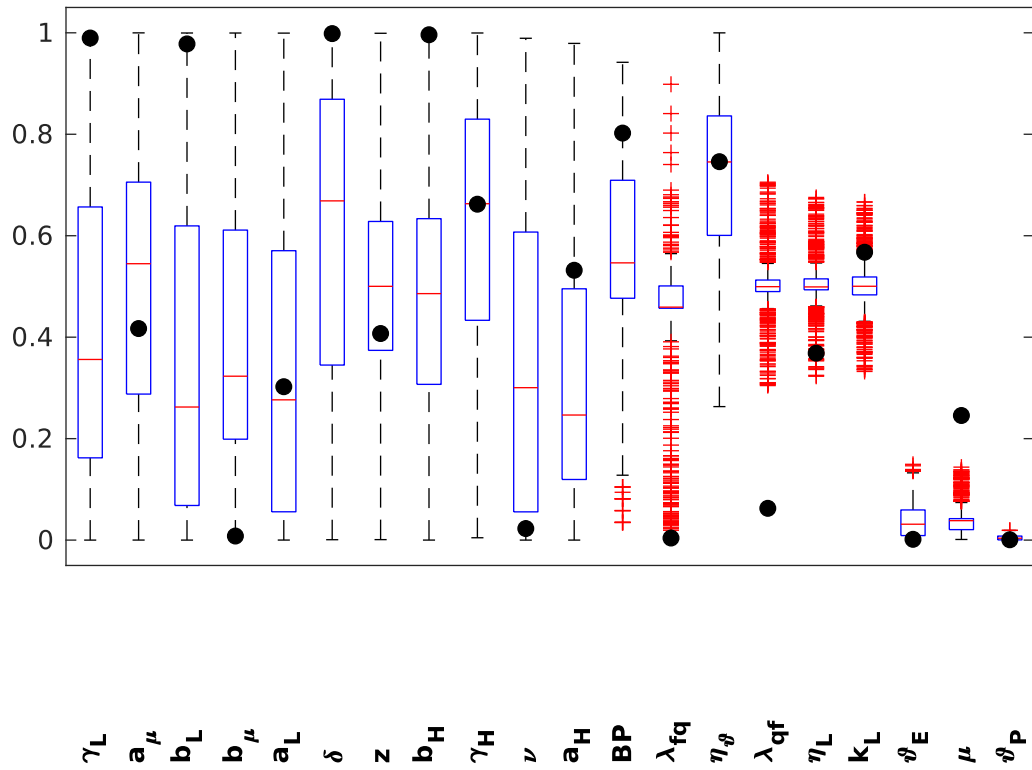
### 10.2. Estimated parameters with their intervals

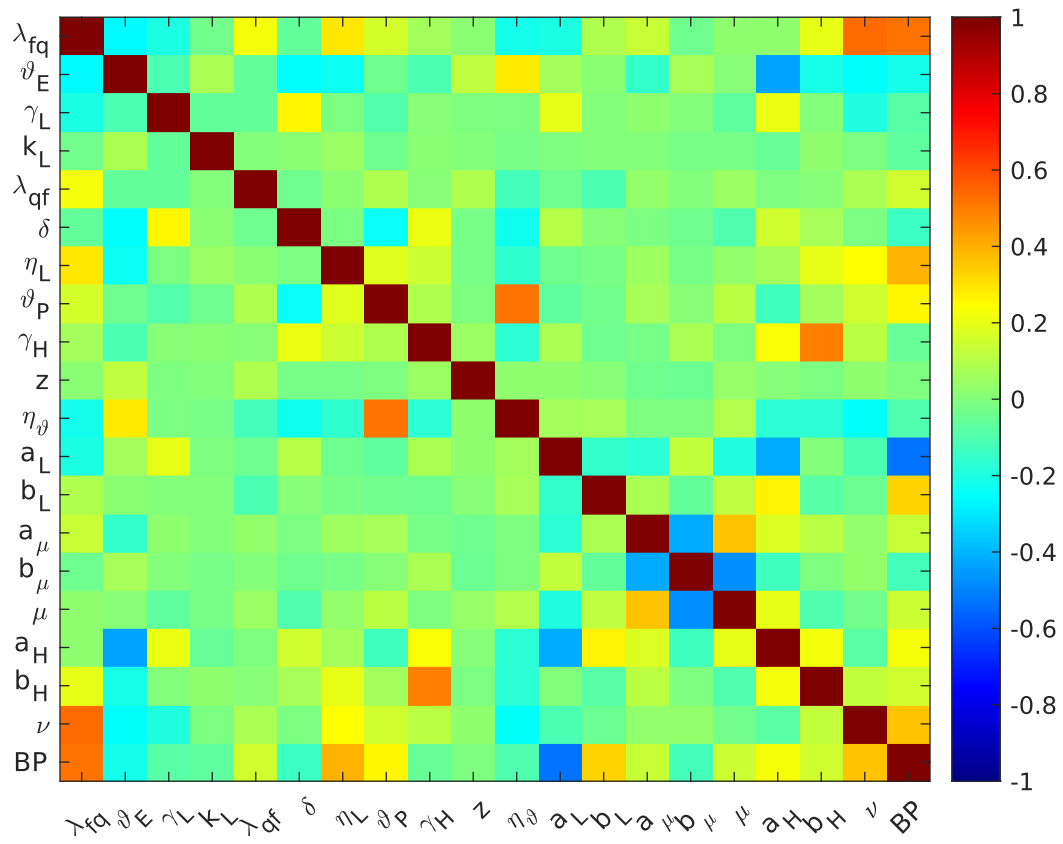
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

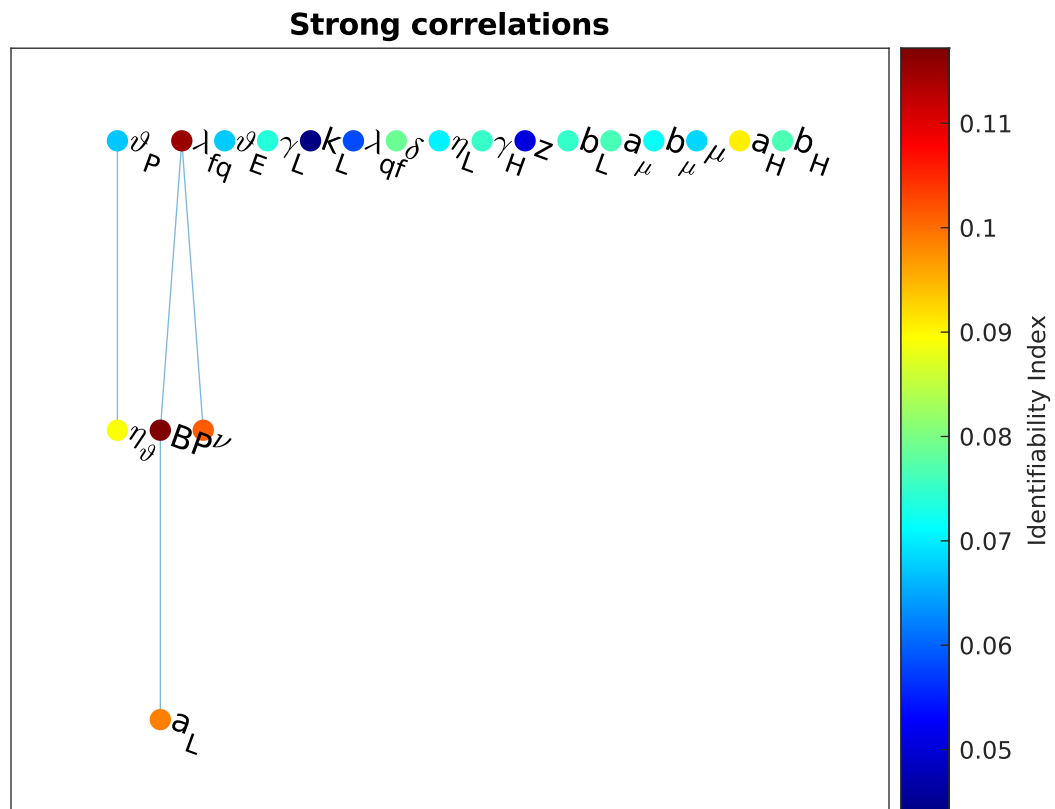
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0092'	'0.4592'	'0.0041'	'0.1151'
$\vartheta_E$	'0'	'0.0035'	'0.0313'	'0.0016'	'0.0677'
$\gamma_L$	'0.1'	'1'	'0.3561'	'0.9897'	'0.074'
$k_L$	'1'	'10'	'5.5033'	'6.107'	'0.044'
$\lambda_{qf}$	'0'	'0.1353'	'0.4996'	'0.0626'	'0.0584'
$\delta$	'0.0974'	'0.15'	'0.1003'	'0.1498'	'0.0789'
$\eta_L$	'0'	'0.8291'	'0.4991'	'0.3685'	'0.0705'
$\vartheta_P$	'0'	'0.0014'	'0.0037'	'0.0007'	'0.0672'
$\gamma_H$	'0.2243'	'1'	'0.6631'	'0.6621'	'0.0752'
$z$	'1.0785'	'30'	'15.0073'	'12.2162'	'0.0507'
$\eta_{\vartheta}$	'0.6704'	'1'	'0.7454'	'0.746'	'0.0892'
$a_L$	'1.35'	'15'	'4.8708'	'5.2333'	'0.0986'
$b_L$	'1'	'15'	'4.6726'	'14.6933'	'0.0751'
$a_{\mu}$	'6.5061'	'12.179'	'8.6277'	'6.8383'	'0.0765'
$b_{\mu}$	'1'	'4.5738'	'5.523'	'1.1122'	'0.0719'
$\mu$	'0'	'0.5305'	'0.0383'	'0.2456'	'0.0683'
$a_H$	'6.0529'	'11.3362'	'4.4517'	'8.4467'	'0.0909'
$b_H$	'6.1137'	'15'	'7.8022'	'14.9464'	'0.0767'
$\nu$	'10.9129'	'28.0399'	'150.2281'	'11.3788'	'0.1012'
BP	'378.2263'	'389'	'369.4994'	'380.4999'	'0.1172'

### 10.3. Identifiability analysis

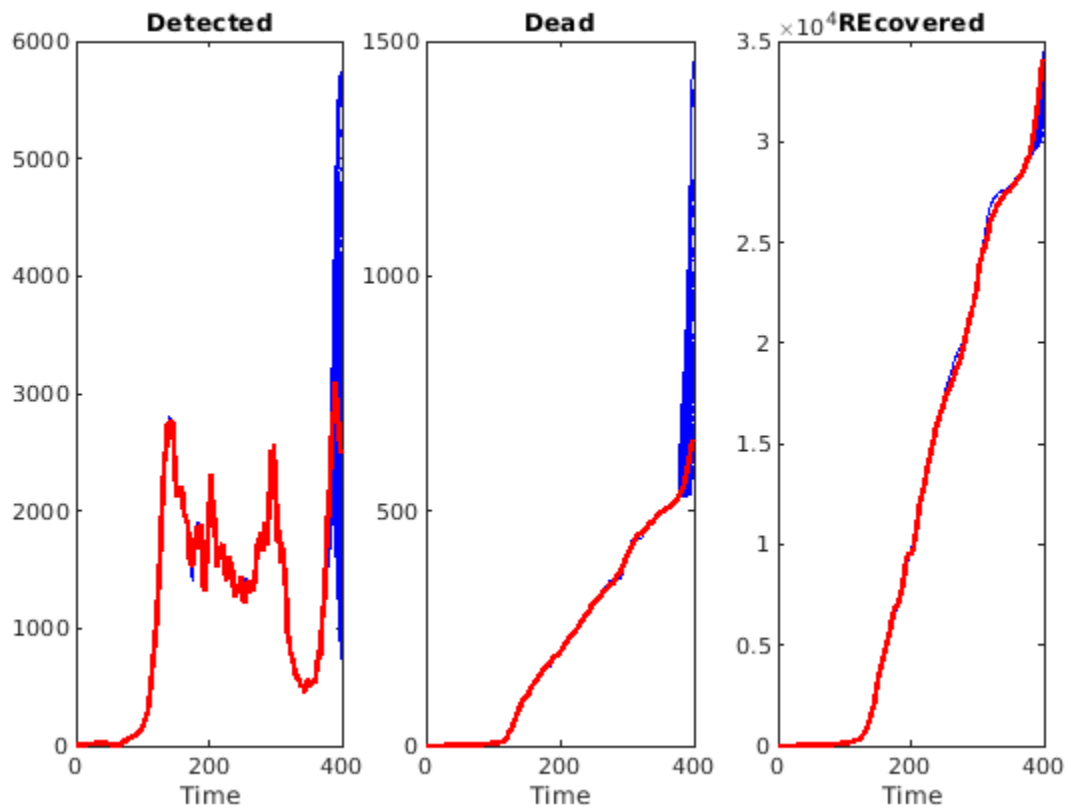






## 10.4. Uncertainty analysis

N=500



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## Chapter 11. Extension number11

### 11.1. Basic information

The extension to be validated consists of the time series from the data399 to the 449. The status of the validation is: COMPLETED.

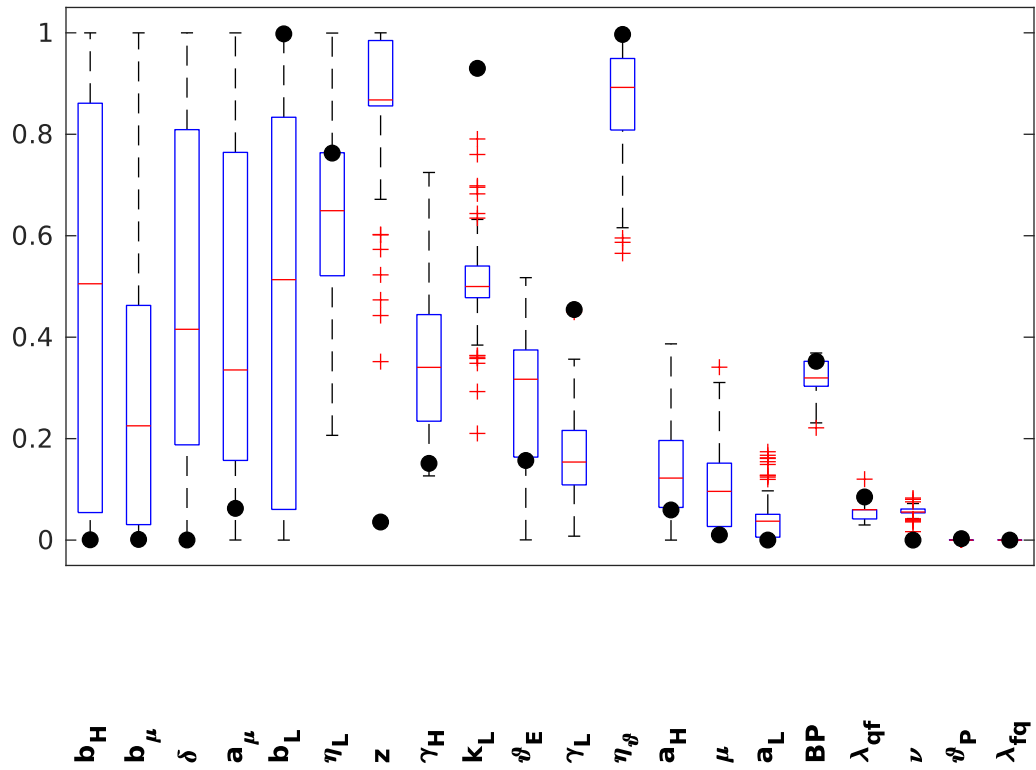
The number of estimations needed to perform the validation was1000.

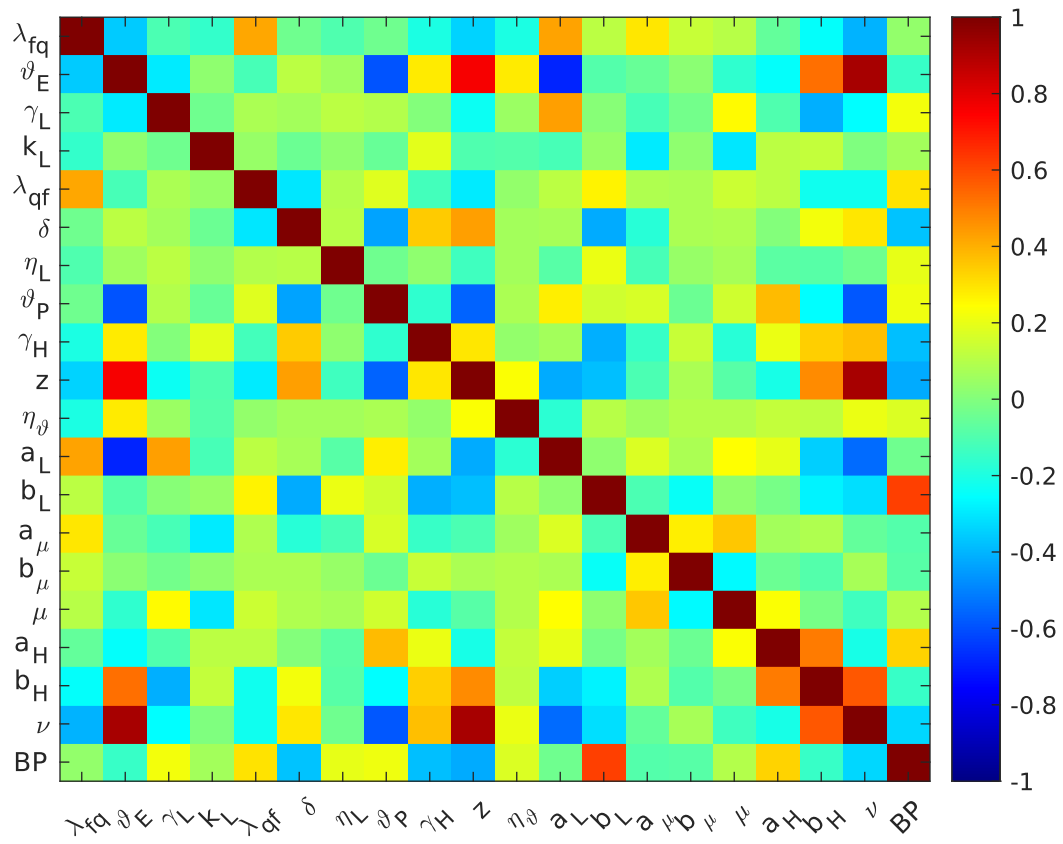
### 11.2. Estimated parameters with their intervals

It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

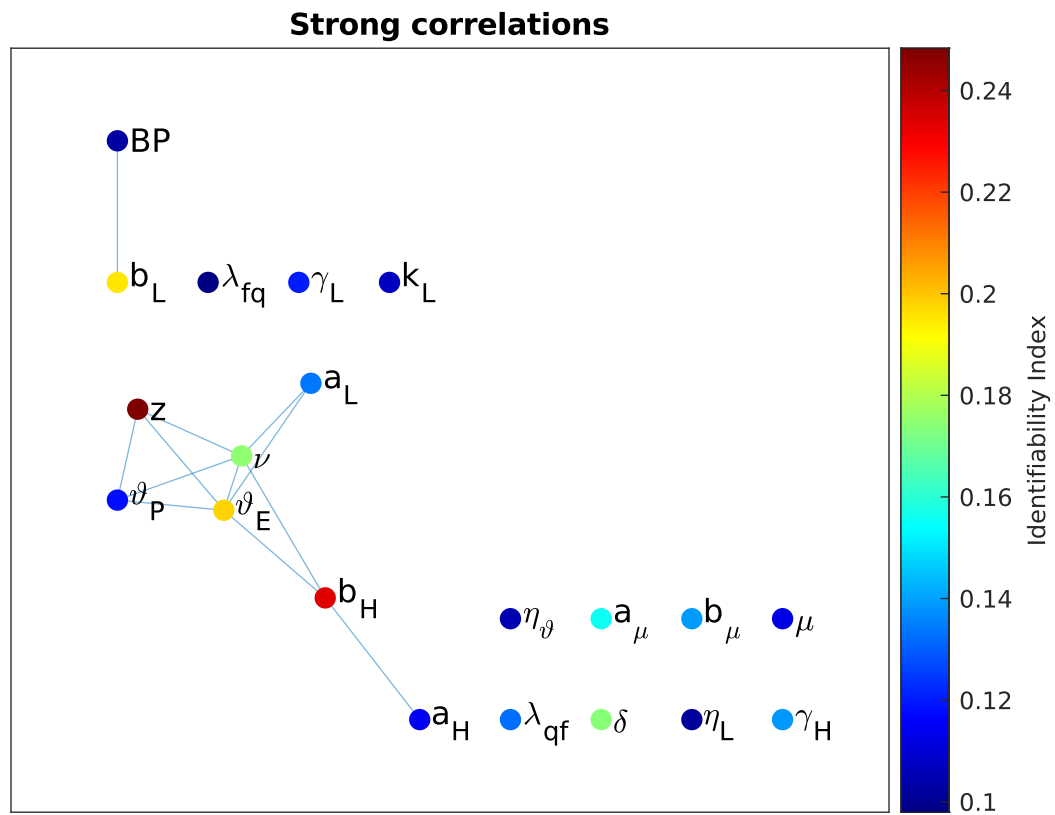
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0527'	'0'	'0'	'0.0979'
$\vartheta_E$	'0.2777'	'0.3565'	'0.3171'	'0.1569'	'0.1983'
$\gamma_L$	'0.0947'	'0.213'	'0.1539'	'0.4545'	'0.1204'
$k_L$	'4.9699'	'6.028'	'5.499'	'9.3697'	'0.1068'
$\lambda_{qf}$	'0'	'0.1347'	'0.0599'	'0.085'	'0.133'
$\delta$	'0.0469'	'0.0778'	'0.0623'	'0'	'0.1741'
$\eta_L$	'0.5931'	'0.7057'	'0.6494'	'0.7629'	'0.1019'
$\vartheta_P$	'0'	'0.0004'	'0.0001'	'0.0028'	'0.1184'
$\gamma_H$	'0.2754'	'0.4057'	'0.3405'	'0.1512'	'0.1388'
$z$	'22.8801'	'29.1824'	'26.0313'	'1.0695'	'0.2483'
$\eta_{\vartheta}$	'0.8412'	'0.9436'	'0.8924'	'0.9968'	'0.1052'
$a_L$	'1.1339'	'1.9098'	'1.5218'	'1.0014'	'0.1338'
$b_L$	'6.6497'	'9.7256'	'8.1877'	'14.9713'	'0.1954'
$a_{\mu}$	'4.3583'	'7.0332'	'5.6957'	'1.8757'	'0.1557'
$b_{\mu}$	'2.894'	'5.4139'	'4.1539'	'1.0186'	'0.1392'
$\mu$	'0.0458'	'0.1463'	'0.096'	'0.0103'	'0.1129'
$a_H$	'2.1973'	'3.2259'	'2.7116'	'1.8316'	'0.1145'
$b_H$	'6.563'	'9.585'	'8.074'	'1.0084'	'0.2338'
$\nu$	'23.9857'	'31.3587'	'27.6722'	'0.0019'	'0.1755'
BP	'396.7707'	'398.2292'	'397.5'	'399.5'	'0.1027'

### 11.3. Identifiability analysis



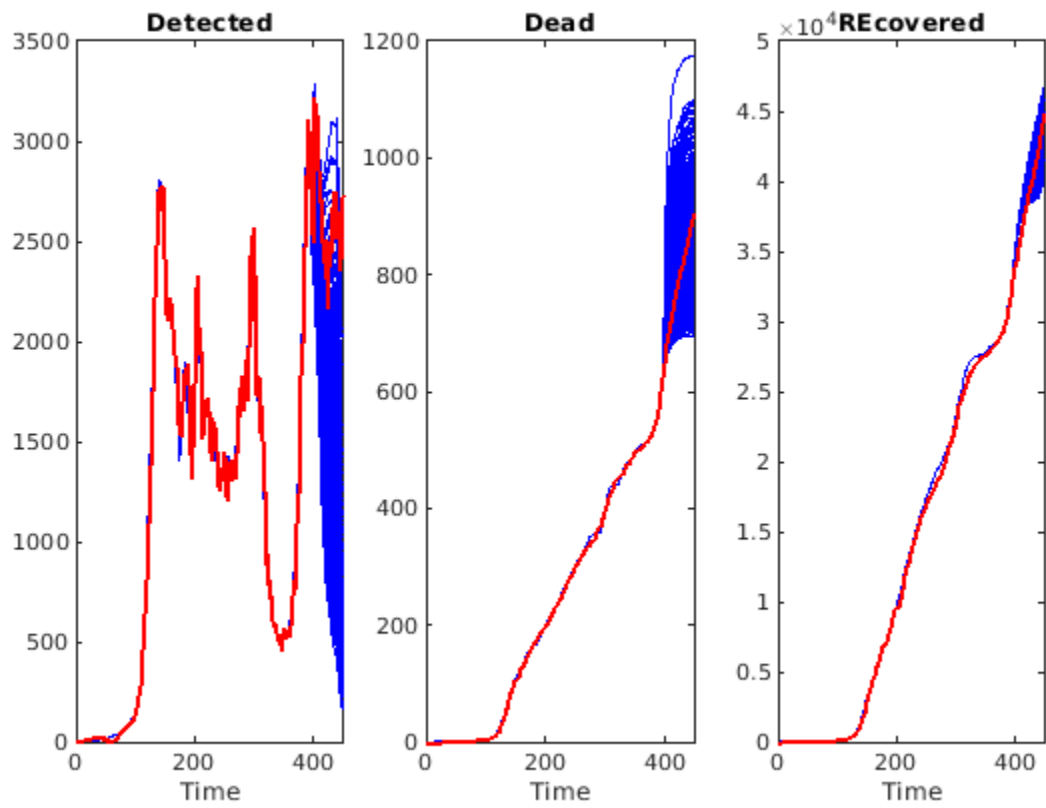






## 11.4. Uncertainty analysis

N=500



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## Chapter 12. Extension number12

### 12.1. Basic information

The extension to be validated consists of the time series from the data449 to the 478. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

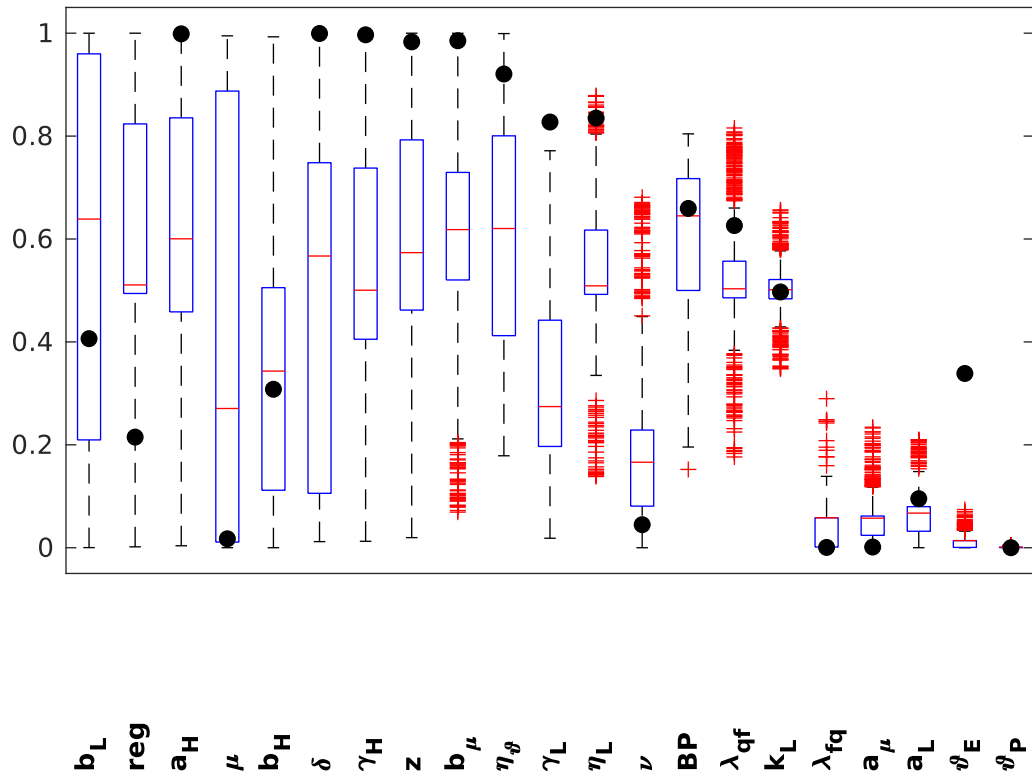
### 12.2. Estimated parameters with their intervals

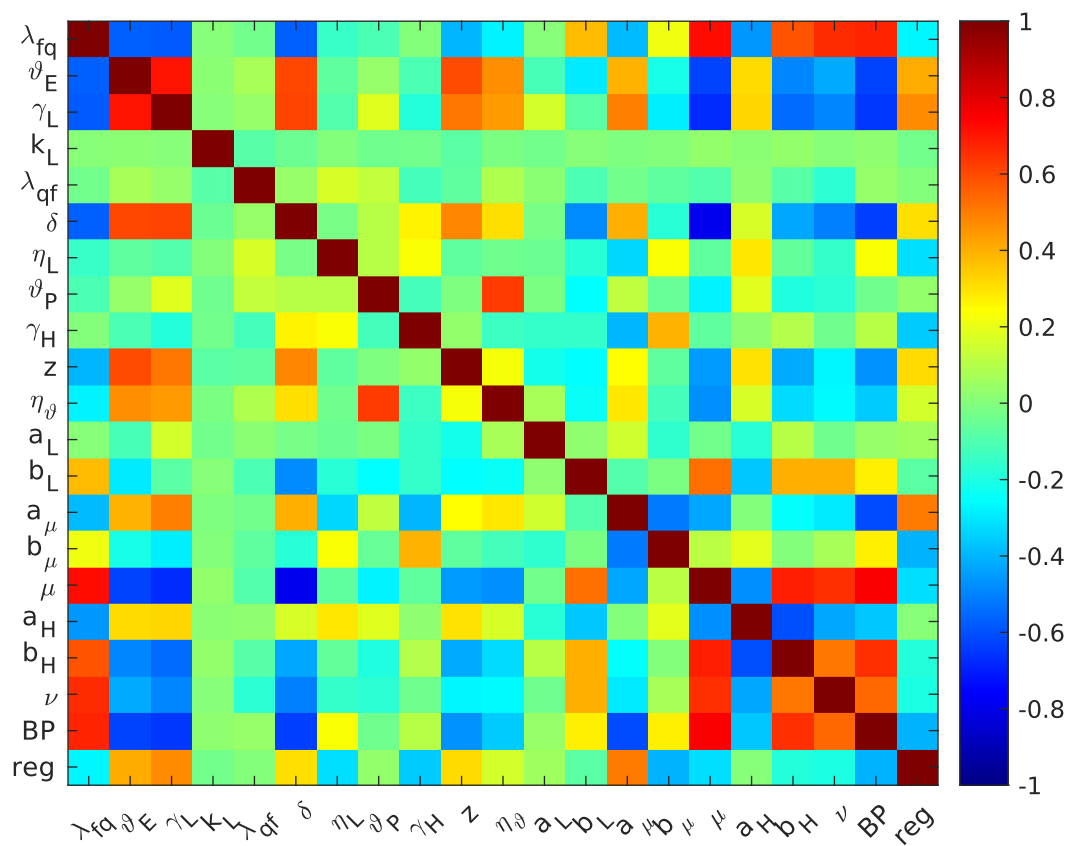
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

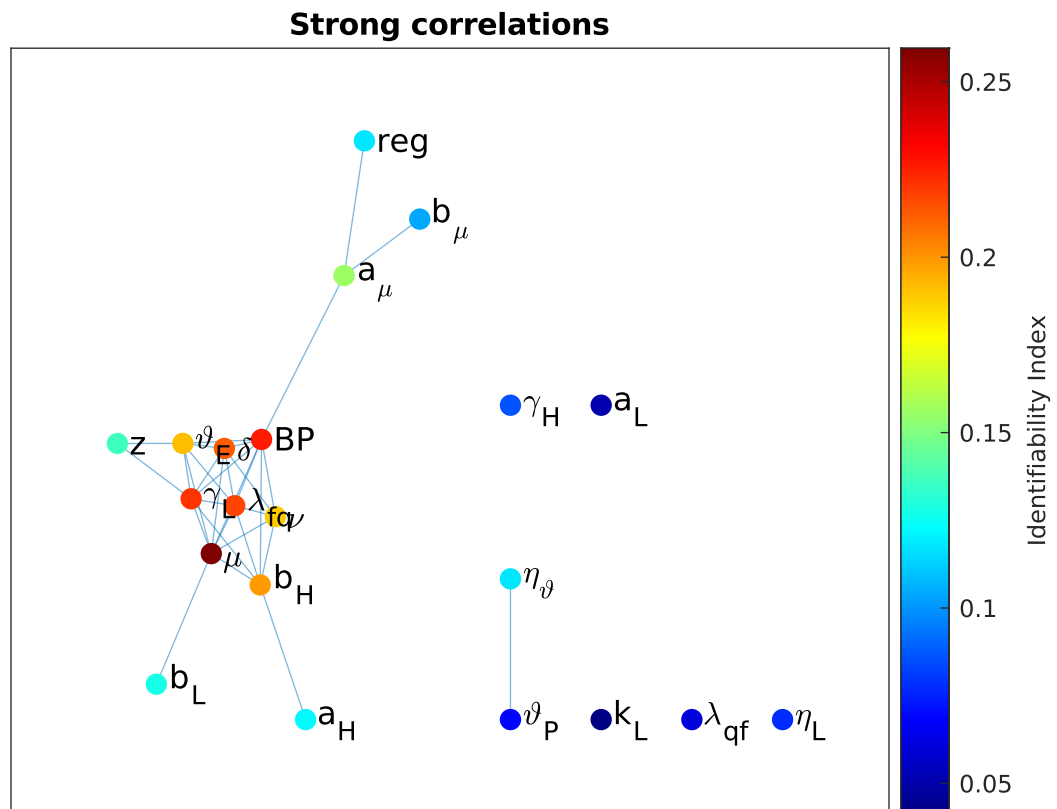
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0014'	'0.0582'	'0.0006'	'0.2172'
$\vartheta_E$	'0.2228'	'0.4165'	'0.0139'	'0.3387'	'0.191'
$\gamma_L$	'0.2742'	'0.9619'	'0.2743'	'0.8273'	'0.2208'
$k_L$	'1'	'10'	'5.5132'	'5.4739'	'0.0418'
$\lambda_{qf}$	'0.0975'	'1'	'0.5032'	'0.6262'	'0.0611'
$\delta$	'0.0753'	'0.15'	'0.085'	'0.1499'	'0.2125'
$\eta_L$	'0.2958'	'0.9639'	'0.5089'	'0.835'	'0.0784'
$\vartheta_P$	'0'	'0.0001'	'0.001'	'0'	'0.0695'
$\gamma_H$	'0.0494'	'1'	'0.5005'	'0.9968'	'0.0862'
$z$	'16.3983'	'30'	'17.2045'	'29.4944'	'0.1369'
$\eta_{\vartheta}$	'0.4143'	'1'	'0.6204'	'0.9207'	'0.1177'
$a_L$	'1'	'3.899'	'1.9419'	'2.3344'	'0.0518'
$b_L$	'2.715'	'15'	'9.9422'	'6.6887'	'0.1281'
$a_{\mu}$	'1'	'12.34'	'1.8046'	'1.0187'	'0.1565'
$b_{\mu}$	'1'	'15'	'9.6557'	'14.7949'	'0.1042'
$\mu$	'0'	'0.039'	'0.2706'	'0.0174'	'0.2596'
$a_H$	'6.6249'	'15'	'9.4053'	'14.9824'	'0.1223'
$b_H$	'1.3159'	'13.019'	'5.8059'	'5.3114'	'0.1988'
$\nu$	'16.3847'	'22.7515'	'83.102'	'22.4007'	'0.1882'
BP	'444.4617'	'450.5649'	'443.5026'	'444.5'	'0.2262'
reg	'0.0531'	'0.0777'	'0.1277'	'0.0538'	'0.1181'

### 12.3. Identifiability analysis

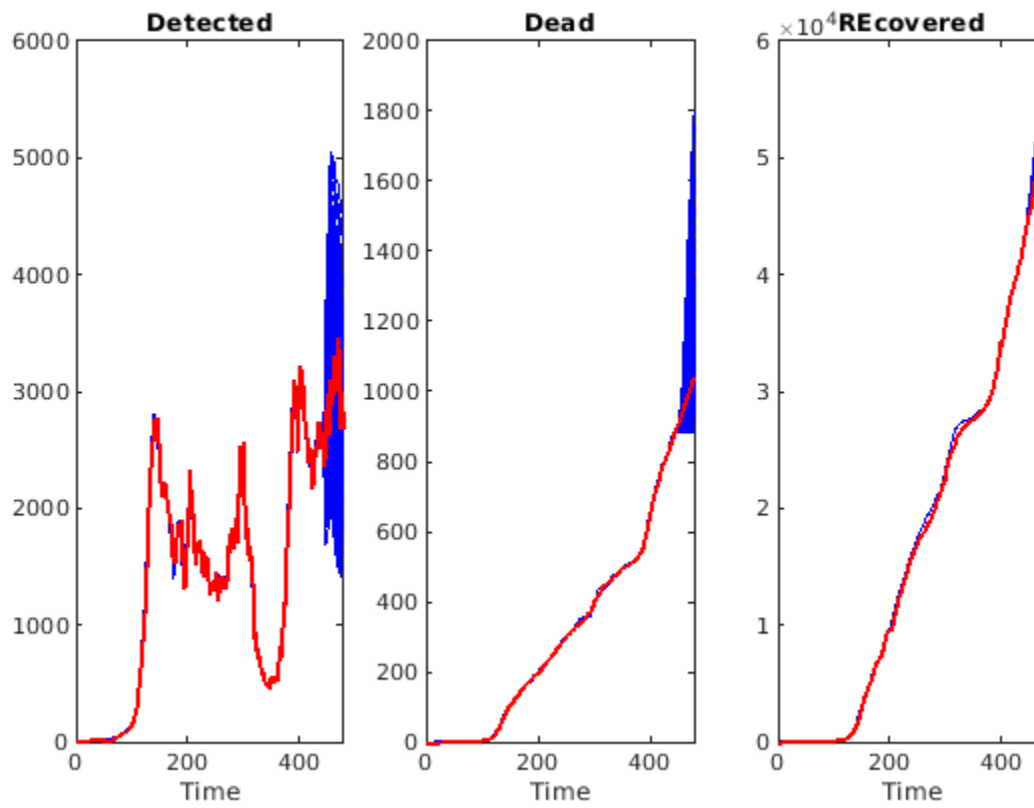






## 12.4. Uncertainty analysis

N=500



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## Chapter 13. Extension number13

### 13.1. Basic information

The extension to be validated consists of the time series from the data478 to the 551. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

### 13.2. Estimated parameters with their intervals

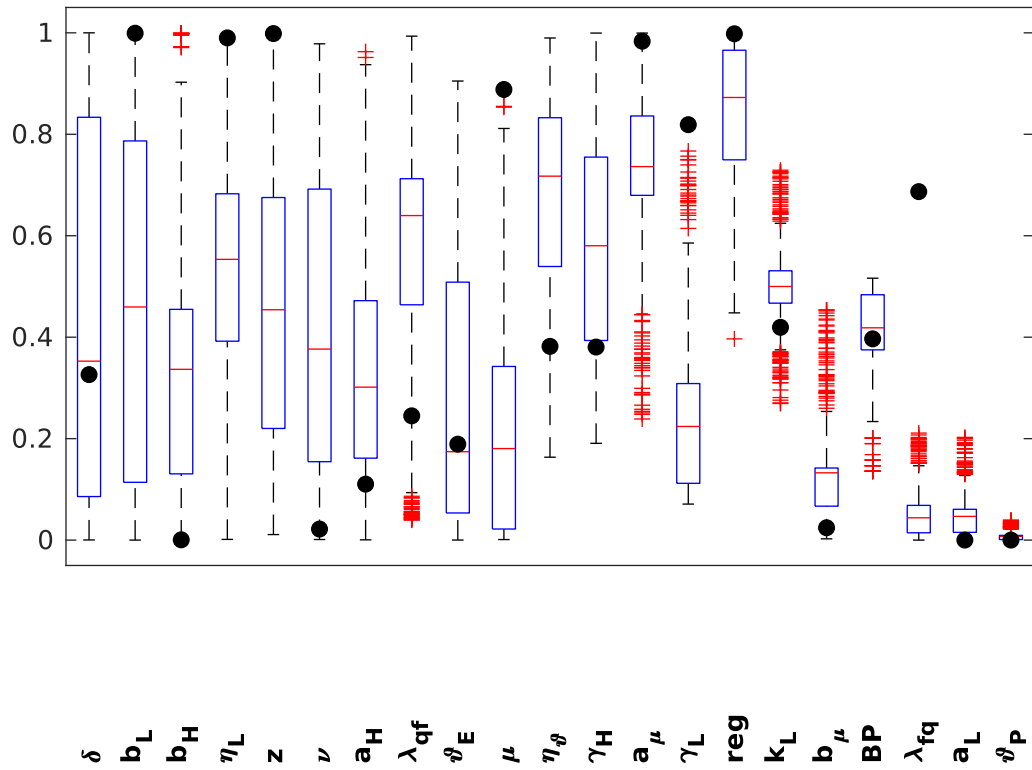
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

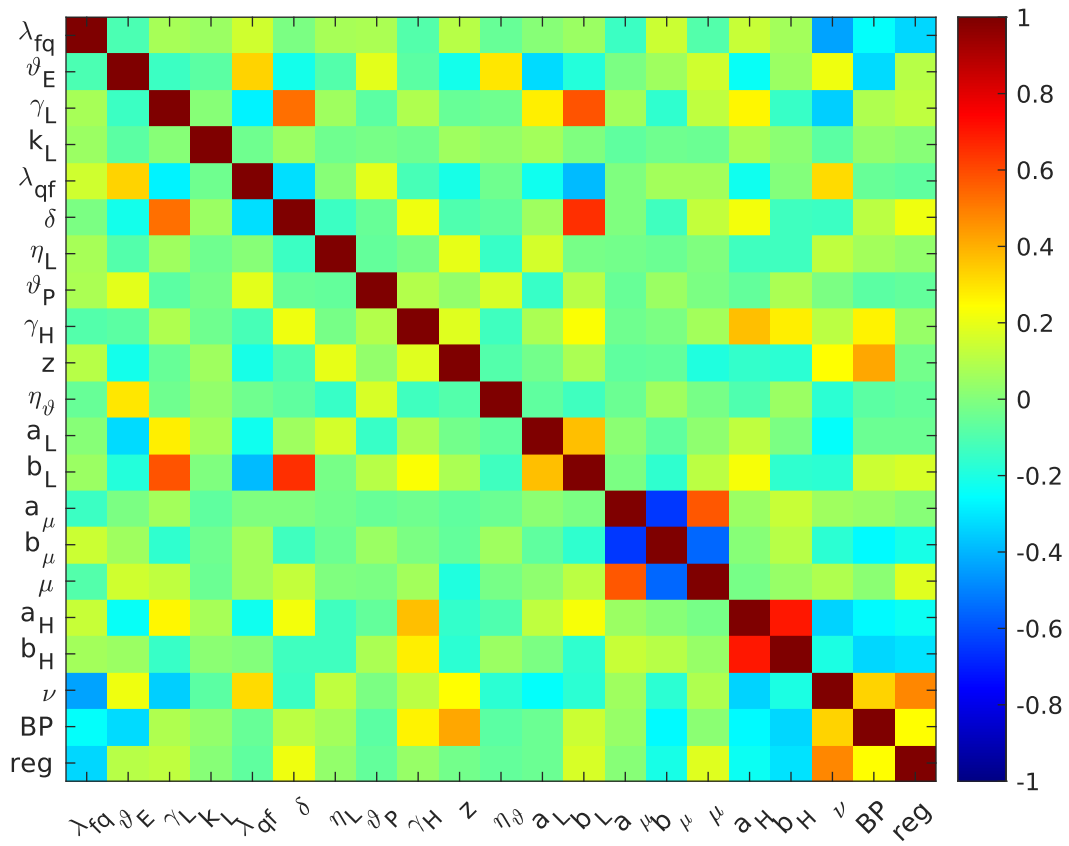
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

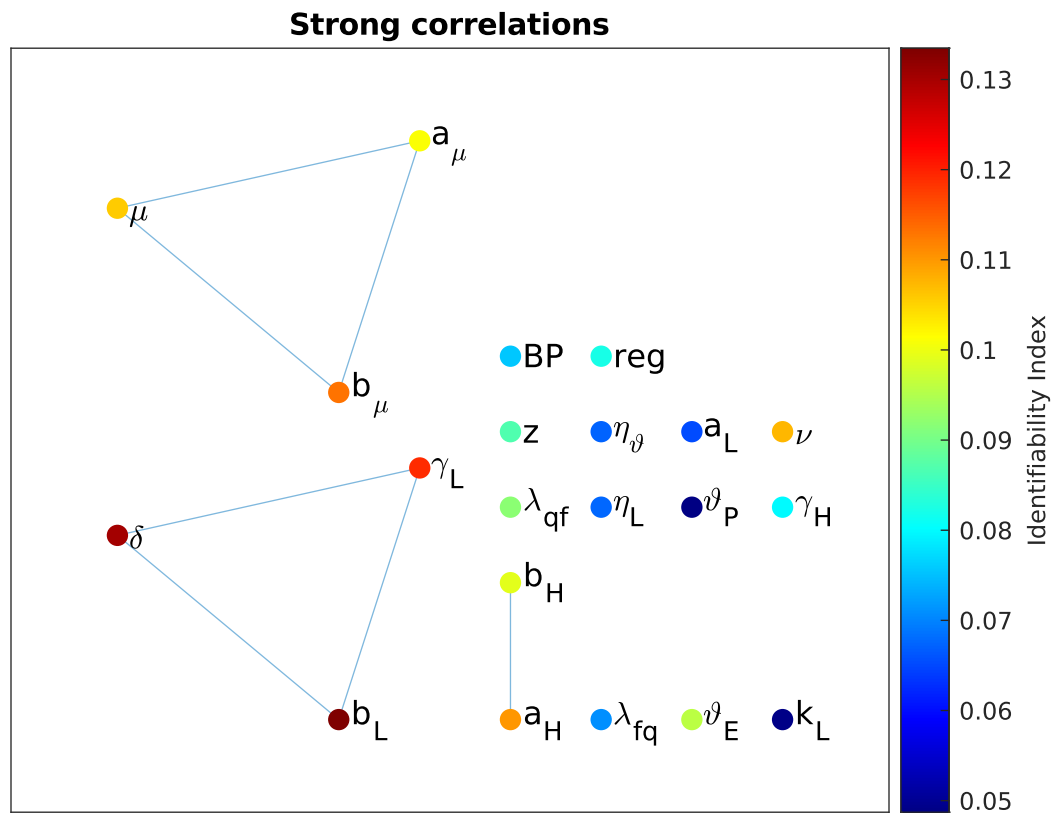
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4515'	'1'	'0.0443'	'0.6869'	'0.0712'
\vartheta_E	'0.1756'	'0.4004'	'0.1745'	'0.1891'	'0.0958'
\gamma_L	'0.5732'	'1'	'0.2241'	'0.8189'	'0.1189'
k_L	'1'	'10'	'5.4998'	'4.7748'	'0.0493'
\lambda_{qf}	'0'	'0.5512'	'0.6397'	'0.245'	'0.0919'
\delta	'0.0457'	'0.1038'	'0.0529'	'0.0489'	'0.1302'
\eta_L	'0'	'1'	'0.5534'	'0.99'	'0.0677'
\vartheta_P	'0'	'0.0001'	'0.0075'	'0.0001'	'0.0487'
\gamma_H	'0.2035'	'0.3809'	'0.5803'	'0.3805'	'0.0801'
z	'0'	'30'	'13.6232'	'29.9559'	'0.0868'
\eta_{\vartheta}	'0.0859'	'0.8207'	'0.7175'	'0.3819'	'0.0673'
a_L	'1'	'3.2022'	'1.655'	'1.001'	'0.0653'
b_L	'2.4'	'15'	'7.4338'	'14.9889'	'0.1335'
a_{\mu}	'9.6855'	'15'	'11.3043'	'14.7683'	'0.1012'
b_{\mu}	'1'	'2.1434'	'2.8577'	'1.3411'	'0.113'
\mu	'0.1'	'0.9883'	'0.1806'	'0.8883'	'0.1059'
a_H	'2.5414'	'3.255'	'5.2225'	'2.5447'	'0.1101'
b_H	'1'	'1.3102'	'5.7131'	'1.0076'	'0.0992'
\nu	'3.6866'	'500'	'188.2663'	'10.8836'	'0.1076'
BP	'485.4931'	'487.9635'	'487.5'	'485.5'	'0.0757'
reg	'0'	'0.25'	'0.218'	'0.2495'	'0.0824'



### 13.3. Identifiability analysis

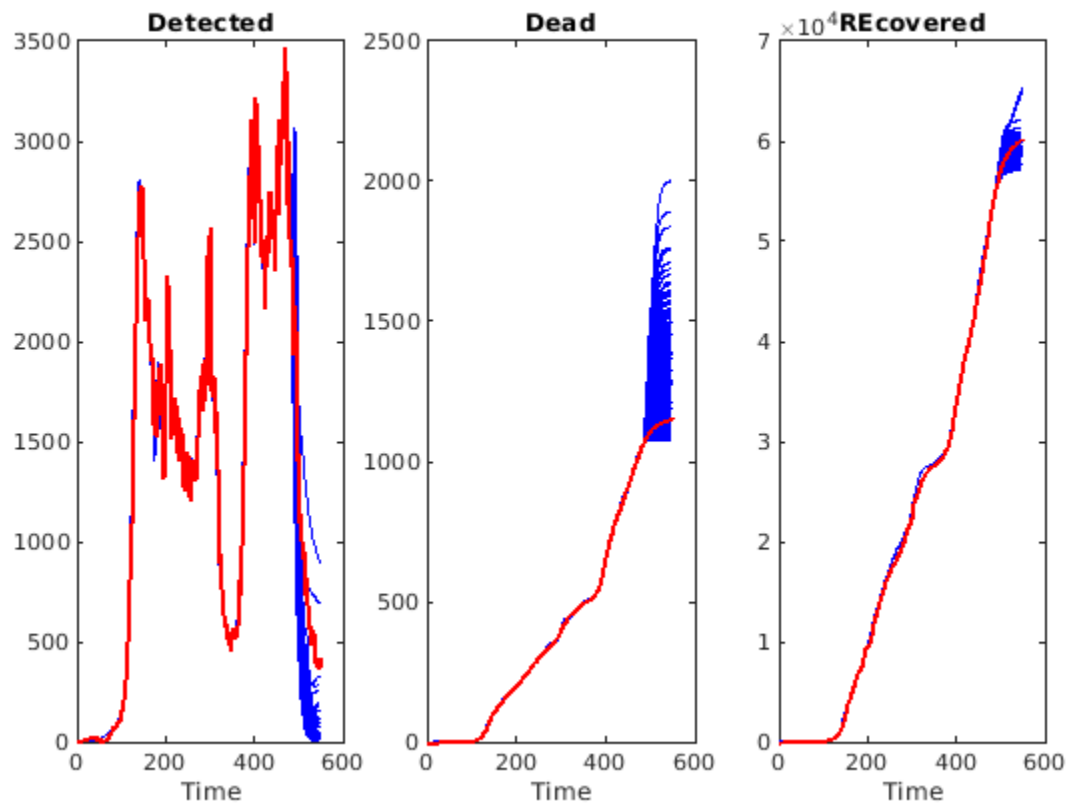






## 13.4. Uncertainty analysis

N=500



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## Chapter 14. Extension number14

### 14.1. Basic information

The extension to be validated consists of the time series from the data551 to the 626. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

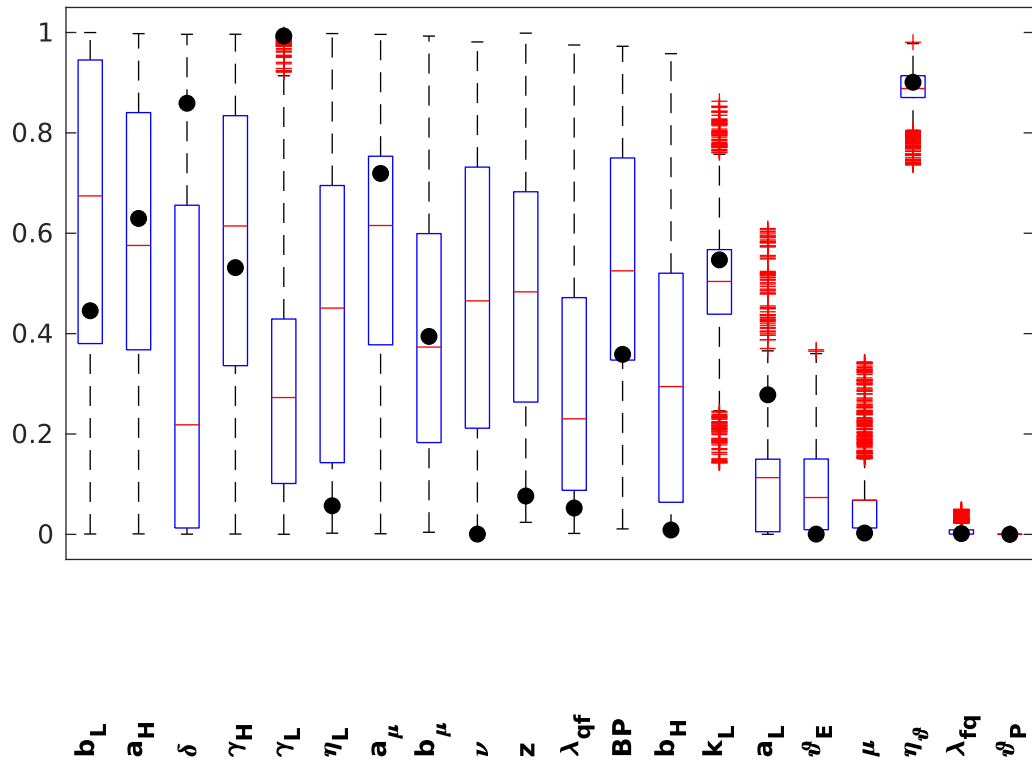
### 14.2. Estimated parameters with their intervals

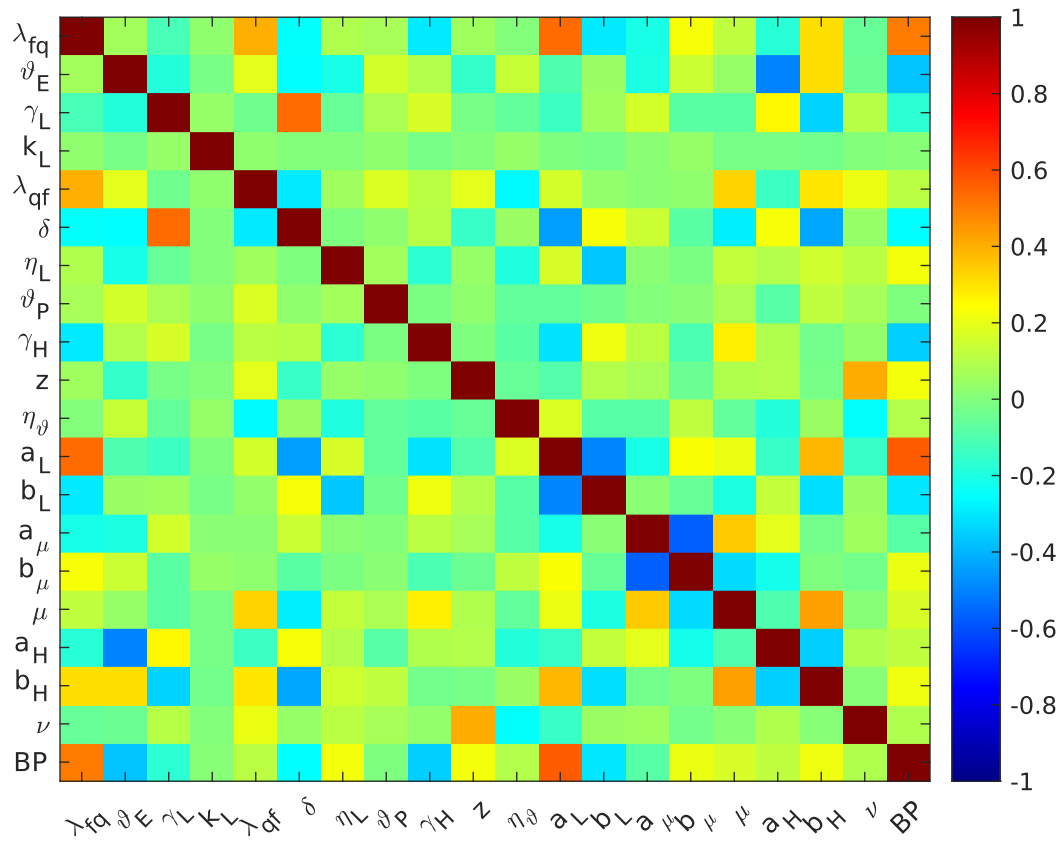
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

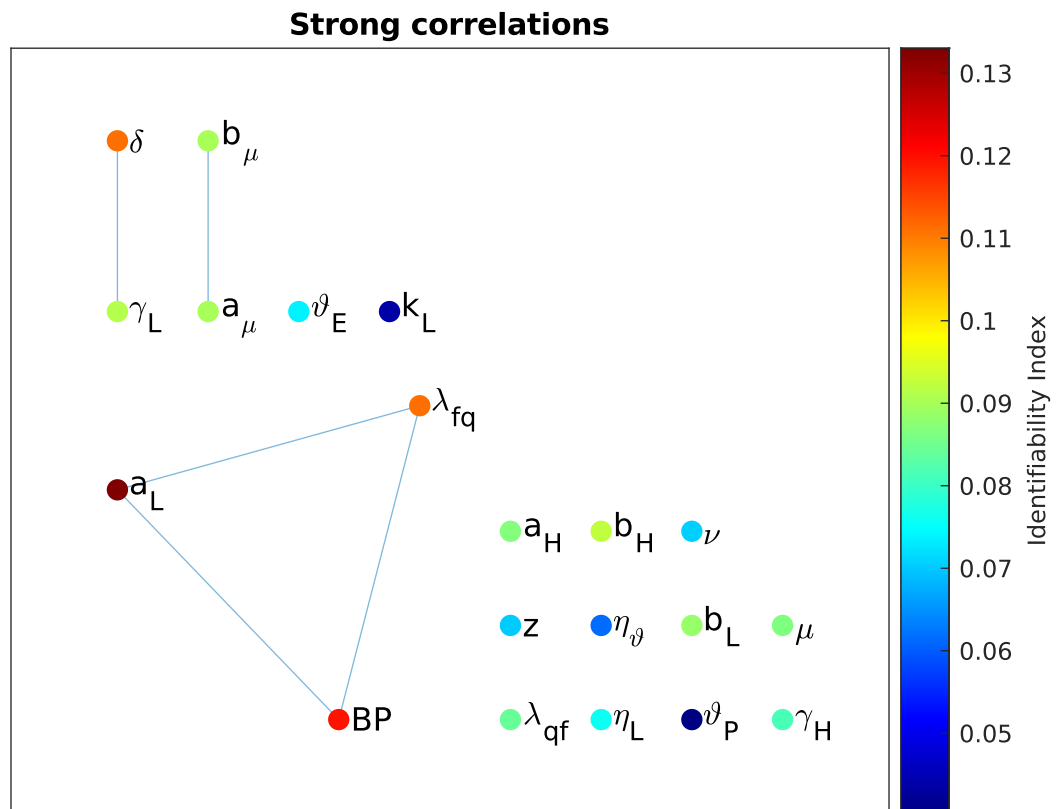
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0007'	'0.0027'	'0.0093'	'0.0016'	'0.111'
$\vartheta_E$	'0'	'0.0011'	'0.0739'	'0.0005'	'0.0737'
$\gamma_L$	'0.2125'	'1'	'0.2726'	'0.9931'	'0.0913'
$k_L$	'1.9'	'8.461'	'5.5356'	'5.9228'	'0.0439'
$\lambda_{qf}$	'0.0503'	'0.0672'	'0.2307'	'0.0525'	'0.0843'
$\delta$	'0.1036'	'0.1377'	'0.0327'	'0.1289'	'0.1112'
$\eta_L$	'0.0414'	'0.0652'	'0.4509'	'0.057'	'0.0762'
$\vartheta_P$	'0'	'0.0001'	'0.0002'	'0'	'0.0404'
$\gamma_H$	'0.1009'	'0.672'	'0.6145'	'0.5315'	'0.0815'
$z$	'2.284'	'2.4598'	'14.4974'	'2.2923'	'0.0703'
$\eta_{\vartheta}$	'0.4807'	'0.9465'	'0.8882'	'0.9008'	'0.0617'
$a_L$	'2.0112'	'10.3328'	'2.5857'	'4.893'	'0.133'
$b_L$	'2.6177'	'15'	'10.4415'	'7.2382'	'0.0888'
$a_{\mu}$	'1.7'	'13.936'	'9.6159'	'11.0688'	'0.09'
$b_{\mu}$	'1'	'13.6'	'6.2252'	'6.5221'	'0.0903'
$\mu$	'0'	'0.0059'	'0.068'	'0.0026'	'0.0865'
$a_H$	'8.1398'	'15'	'9.0598'	'9.8135'	'0.0868'
$b_H$	'1.0421'	'2.6836'	'5.1228'	'1.1226'	'0.0925'
$\nu$	'0.0237'	'0.5936'	'232.6506'	'0.2638'	'0.0708'
BP	'527.0094'	'544.3027'	'550.4649'	'527.5'	'0.1195'

### 14.3. Identifiability analysis



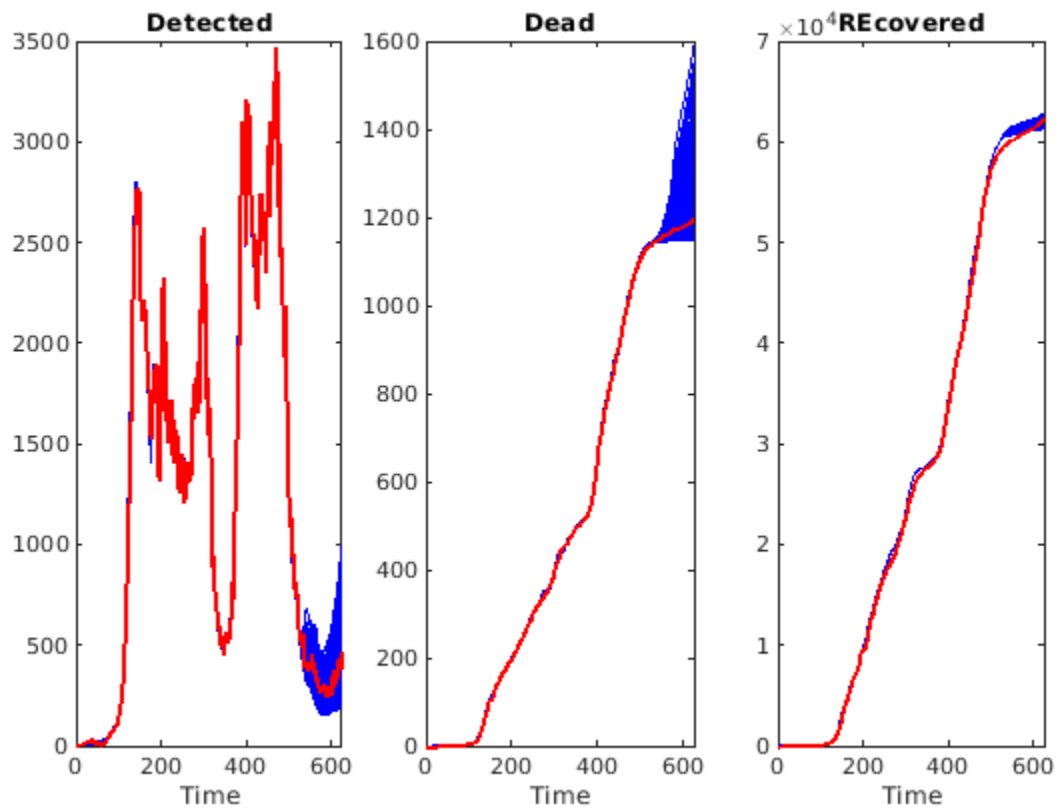






## 14.4. Uncertainty analysys

N=500



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## Chapter 15. Extension number15

### 15.1. Basic information

The extension to be validated consists of the time series from the data626 to the 713. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

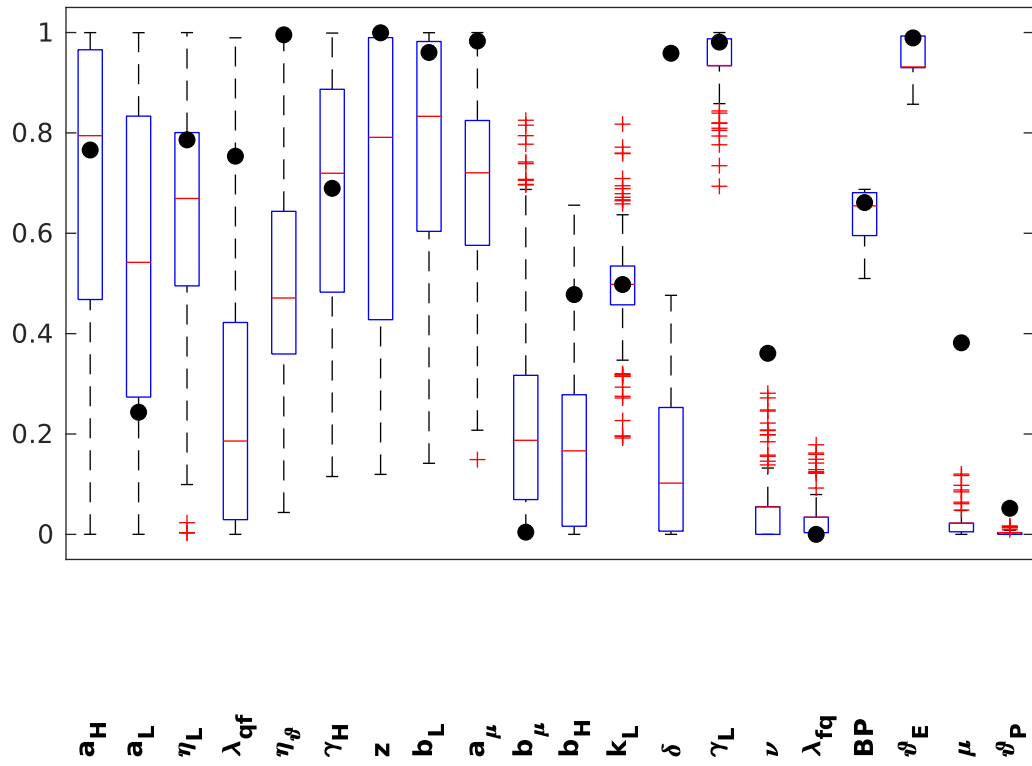
### 15.2. Estimated parameters with their intervals

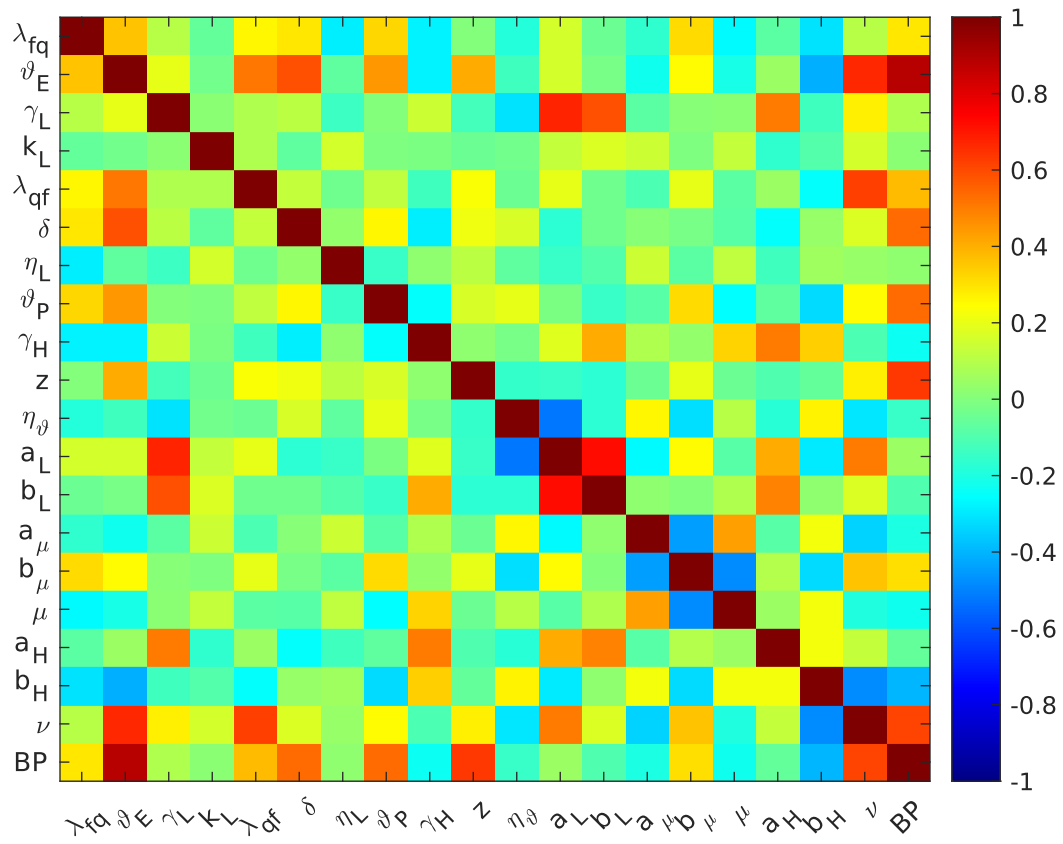
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

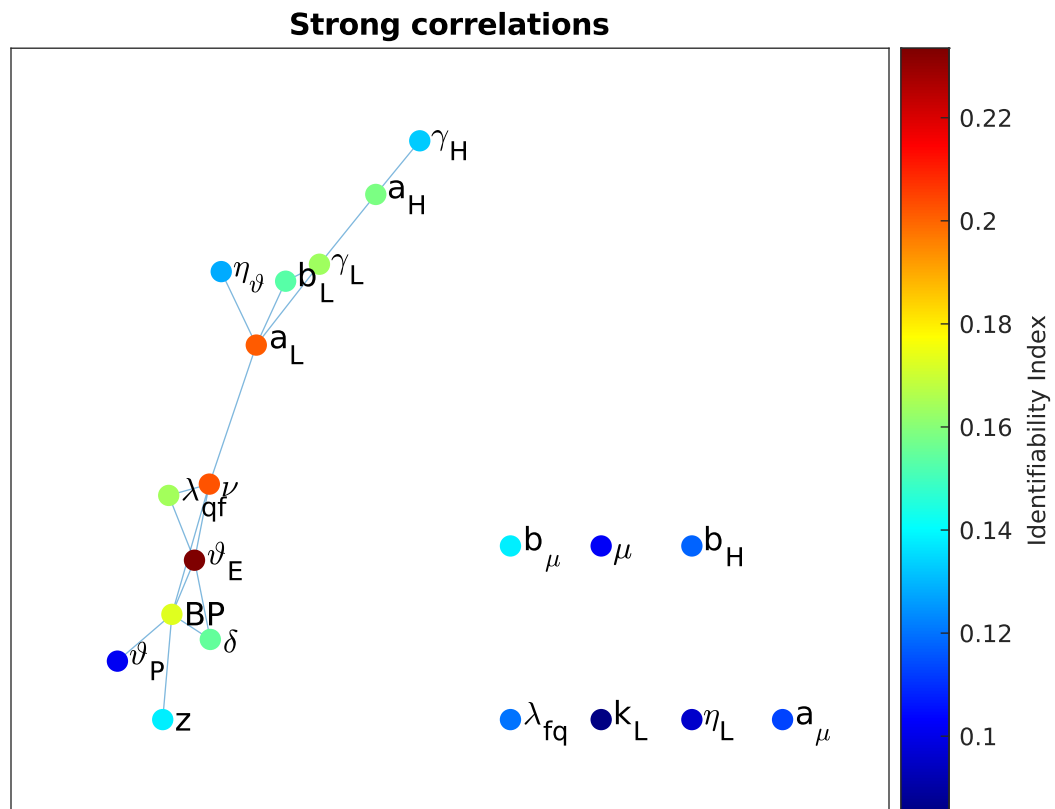
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0001'	'0.0342'	'0'	'0.1203'
$\vartheta_E$	'0.9519'	'1'	'0.93'	'0.9893'	'0.2335'
$\gamma_L$	'0.3917'	'1'	'0.9339'	'0.981'	'0.1637'
$k_L$	'1'	'9.208'	'5.4833'	'5.4811'	'0.0852'
$\lambda_{qf}$	'0.24'	'0.9157'	'0.1897'	'0.7536'	'0.1646'
$\delta$	'0'	'0.144'	'0.0163'	'0.1438'	'0.1548'
$\eta_L$	'0.2593'	'0.9321'	'0.6694'	'0.7861'	'0.0958'
$\vartheta_P$	'0.0201'	'0.112'	'0.0035'	'0.052'	'0.1017'
$\gamma_H$	'0.2676'	'0.9625'	'0.7196'	'0.6896'	'0.1333'
$z$	'21.0461'	'30'	'23.7356'	'29.9844'	'0.1381'
$\eta_{\vartheta}$	'0.5683'	'1'	'0.4711'	'0.9955'	'0.1286'
$a_L$	'3.9998'	'6.502'	'8.5892'	'4.4077'	'0.2015'
$b_L$	'7.4989'	'14.7'	'12.6525'	'14.4438'	'0.1534'
$a_{\mu}$	'7.5391'	'15'	'11.0827'	'14.7638'	'0.1134'
$b_{\mu}$	'1'	'8.3483'	'3.6968'	'1.062'	'0.1381'
$\mu$	'0'	'0.8246'	'0.0224'	'0.3817'	'0.1023'
$a_H$	'3.3412'	'11.975'	'12.1222'	'11.723'	'0.1586'
$b_H$	'4.2604'	'15'	'3.3532'	'7.6905'	'0.1178'
$\nu$	'152.2411'	'211.9706'	'27.6273'	'180.41'	'0.2025'
BP	'649.1835'	'652.5088'	'650.5'	'651.4951'	'0.1733'

### 15.3. Identifiability analysis







## 15.4. Uncertainty analysis

N=500

