

# **Validation process forYOPAL**

**The epidemiology research group, EAFIT**

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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 111. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was 2000.

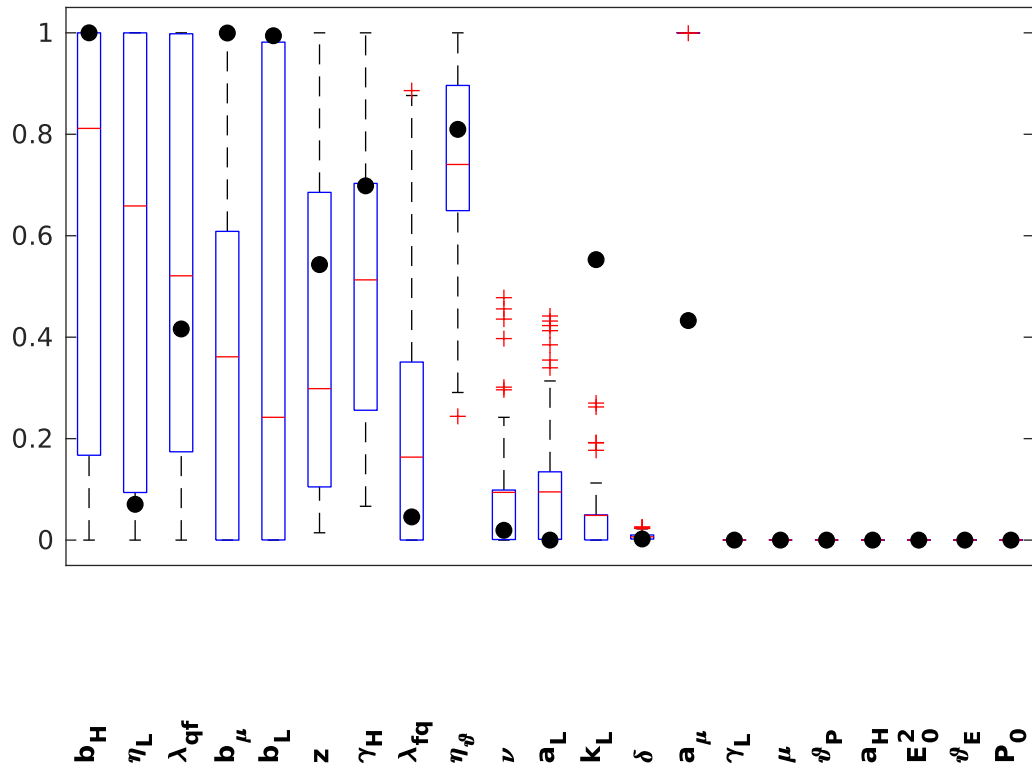
### 1.2. Estimated parameters with their intervals

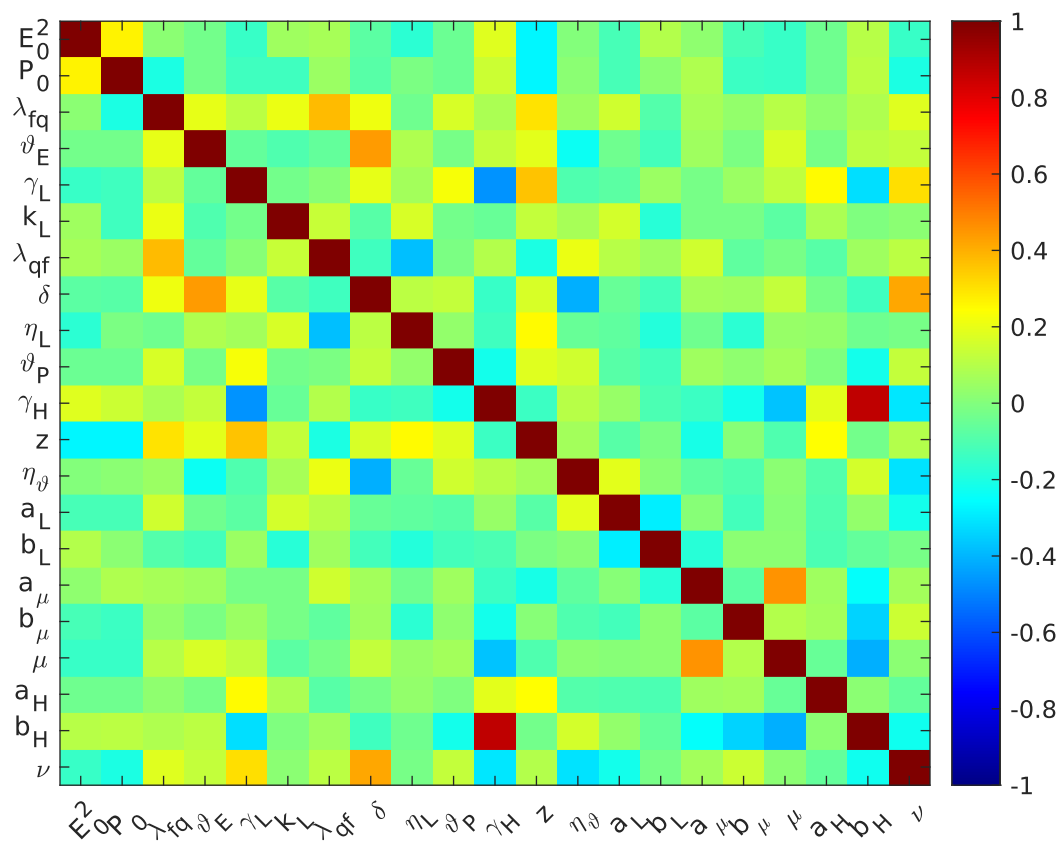
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

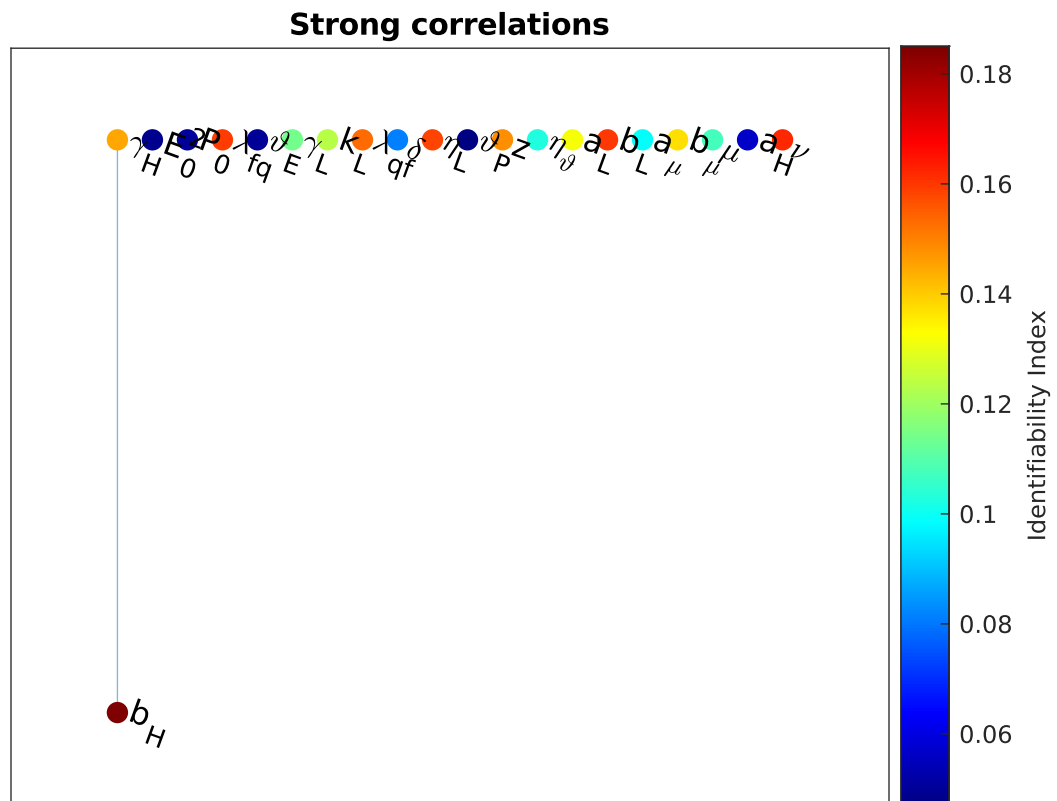
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$E^2_0$	'0'	'0'	'0'	'0'	'0.0493'
$P_0$	'0'	'0'	'0'	'0'	'0.0505'
$\lambda_{fq}$	'0.0361'	'0.0521'	'0.1687'	'0.0457'	'0.1595'
$\vartheta_E$	'0'	'0'	'0'	'0'	'0.0504'
$\gamma_L$	'0'	'0'	'0'	'0'	'0.1144'
$k_L$	'1.3844'	'8.3011'	'1.4472'	'5.976'	'0.1235'
$\lambda_{qf}$	'0.3786'	'0.5692'	'0.521'	'0.4162'	'0.1529'
$\delta$	'0.0003'	'0.0004'	'0.001'	'0.0003'	'0.0813'
$\eta_L$	'0.0304'	'0.1009'	'0.6587'	'0.0705'	'0.1582'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0472'
$\gamma_H$	'0.6554'	'0.7014'	'0.513'	'0.6984'	'0.1449'
$z$	'15.3495'	'16.4072'	'8.9567'	'16.2932'	'0.1481'
$\eta_{\vartheta}$	'0.7996'	'0.8173'	'0.7405'	'0.8097'	'0.103'
$a_L$	'1'	'10.3605'	'2.3402'	'1'	'0.1322'
$b_L$	'3.9435'	'15'	'4.3888'	'14.9199'	'0.1598'
$a_{\mu}$	'1.63'	'11.8644'	'14.9956'	'7.0589'	'0.0991'
$b_{\mu}$	'1.56'	'15'	'6.0585'	'14.9949'	'0.1374'
$\mu$	'0'	'0'	'0.0001'	'0'	'0.1078'
$a_H$	'1'	'1.0813'	'1'	'1'	'0.0568'
$b_H$	'13.5518'	'15'	'12.3623'	'15'	'0.185'
$\nu$	'8.6799'	'17.9933'	'49.3354'	'9.6636'	'0.1619'

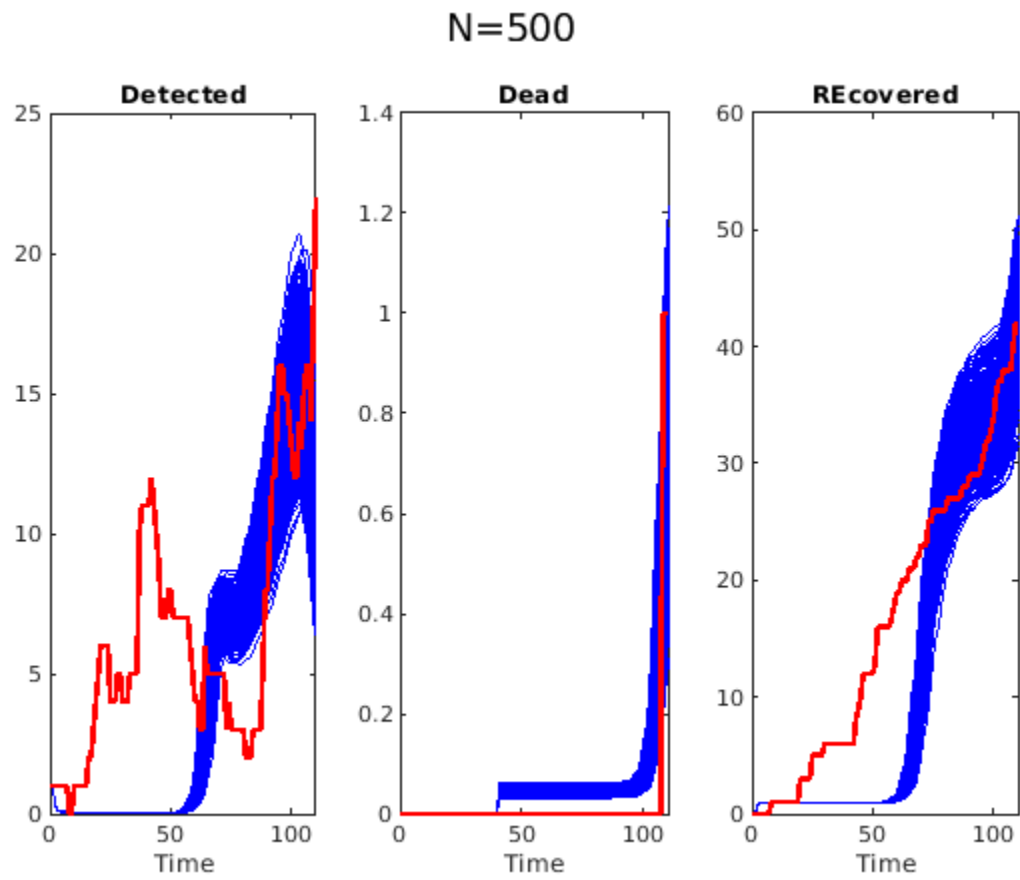
### 1.3. Identifiability analysis







## 1.4. Uncertainty analysys





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## Chapter 2. Extension number2

### 2.1. Basic information

The extension to be validated consists of the time series from the data111 to the 179. The status of the validation is: COMPLETED.

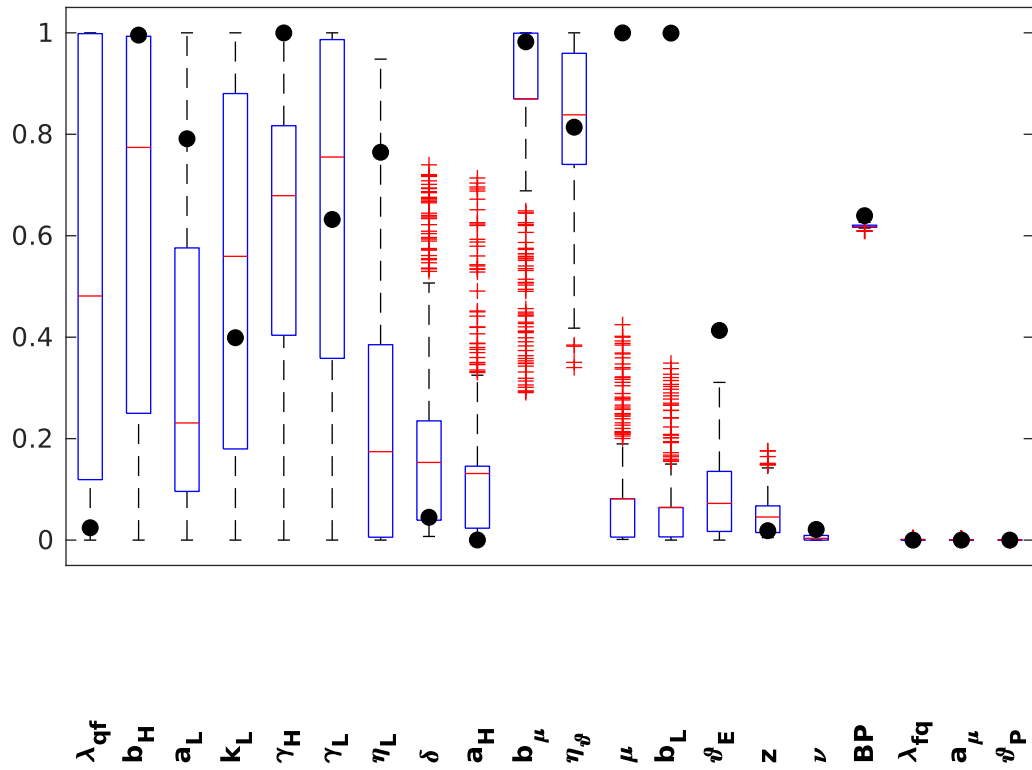
The number of estimations needed to perform the validation was1000.

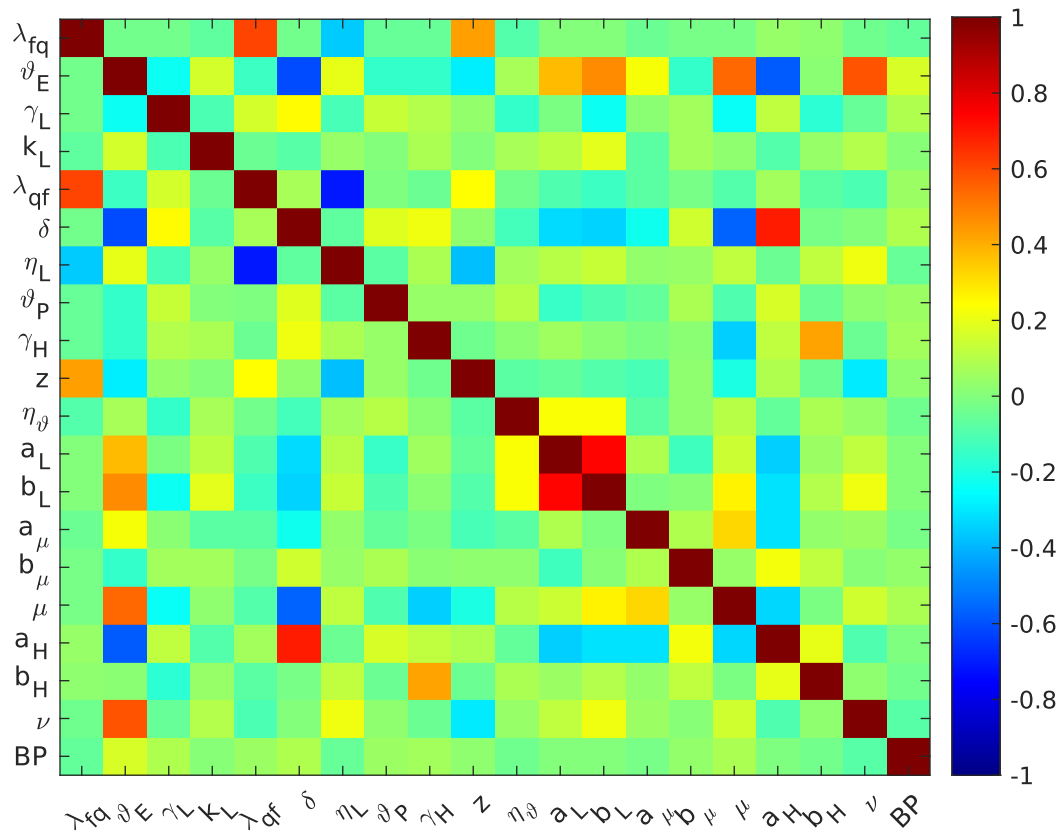
### 2.2. Estimated parameters with their intervals

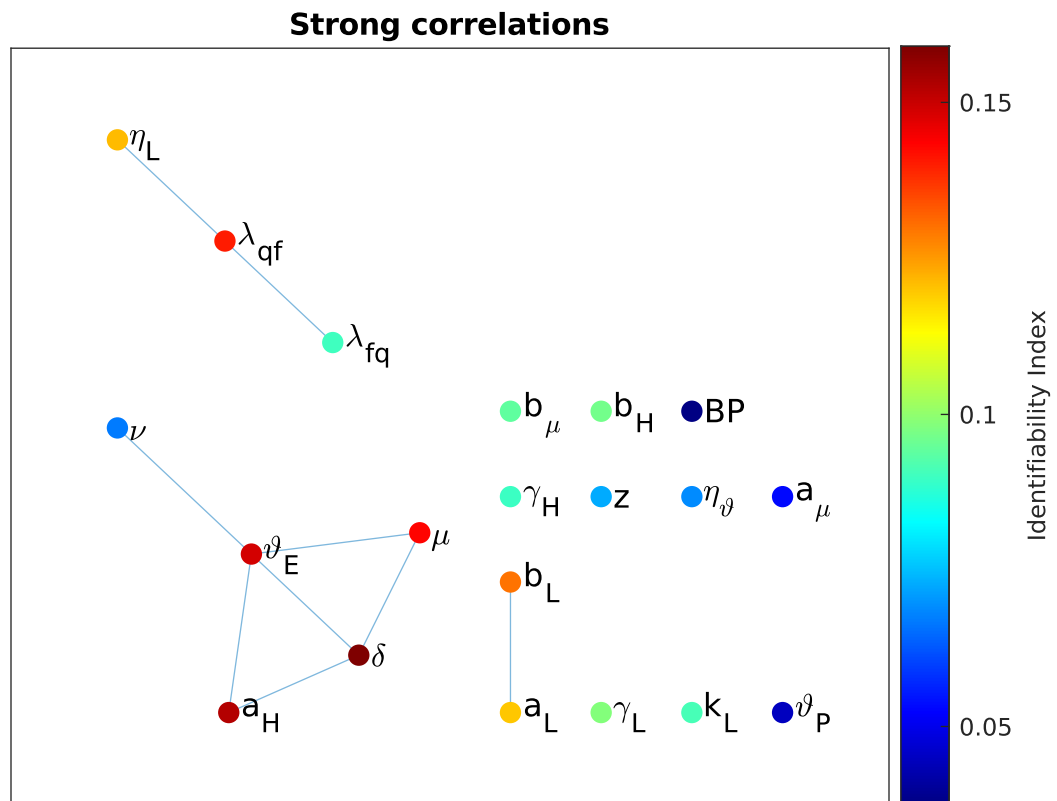
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0564'	'0.0011'	'0'	'0.0905'
$\vartheta_E$	'0.0629'	'0.0818'	'0.0724'	'0.4133'	'0.1487'
$\gamma_L$	'0.7104'	'0.7999'	'0.7552'	'0.6321'	'0.0987'
$k_L$	'5.5925'	'6.4766'	'6.0346'	'4.5907'	'0.0916'
$\lambda_{qf}$	'0.4257'	'0.5368'	'0.4812'	'0.0243'	'0.1404'
$\delta$	'0.0161'	'0.0298'	'0.023'	'0.0067'	'0.159'
$\eta_L$	'0.1274'	'0.2212'	'0.1743'	'0.7646'	'0.1215'
$\vartheta_P$	'0'	'0.0001'	'0'	'0'	'0.0447'
$\gamma_H$	'0.638'	'0.7199'	'0.6789'	'0.9998'	'0.0901'
$z$	'0.8621'	'1.8702'	'1.3661'	'0.5566'	'0.0731'
$\eta_{\vartheta}$	'0.8156'	'0.8611'	'0.8384'	'0.814'	'0.0692'
$a_L$	'3.63'	'4.8367'	'4.2334'	'12.0768'	'0.1199'
$b_L$	'1.2402'	'2.5601'	'1.9001'	'14.9923'	'0.1298'
$a_{\mu}$	'1'	'1.1337'	'1.0104'	'1.0005'	'0.0534'
$b_{\mu}$	'12.4431'	'13.9085'	'13.1758'	'14.7517'	'0.0943'
$\mu$	'0.0345'	'0.1285'	'0.0815'	'0.9998'	'0.1433'
$a_H$	'2.0872'	'3.5878'	'2.8375'	'1.0027'	'0.1525'
$b_H$	'11.1145'	'12.5601'	'11.8373'	'14.9372'	'0.0967'
$\nu$	'1.0167'	'2.4702'	'1.7435'	'10.509'	'0.0671'
BP	'110.8748'	'111.1235'	'110.9991'	'114.8288'	'0.0375'

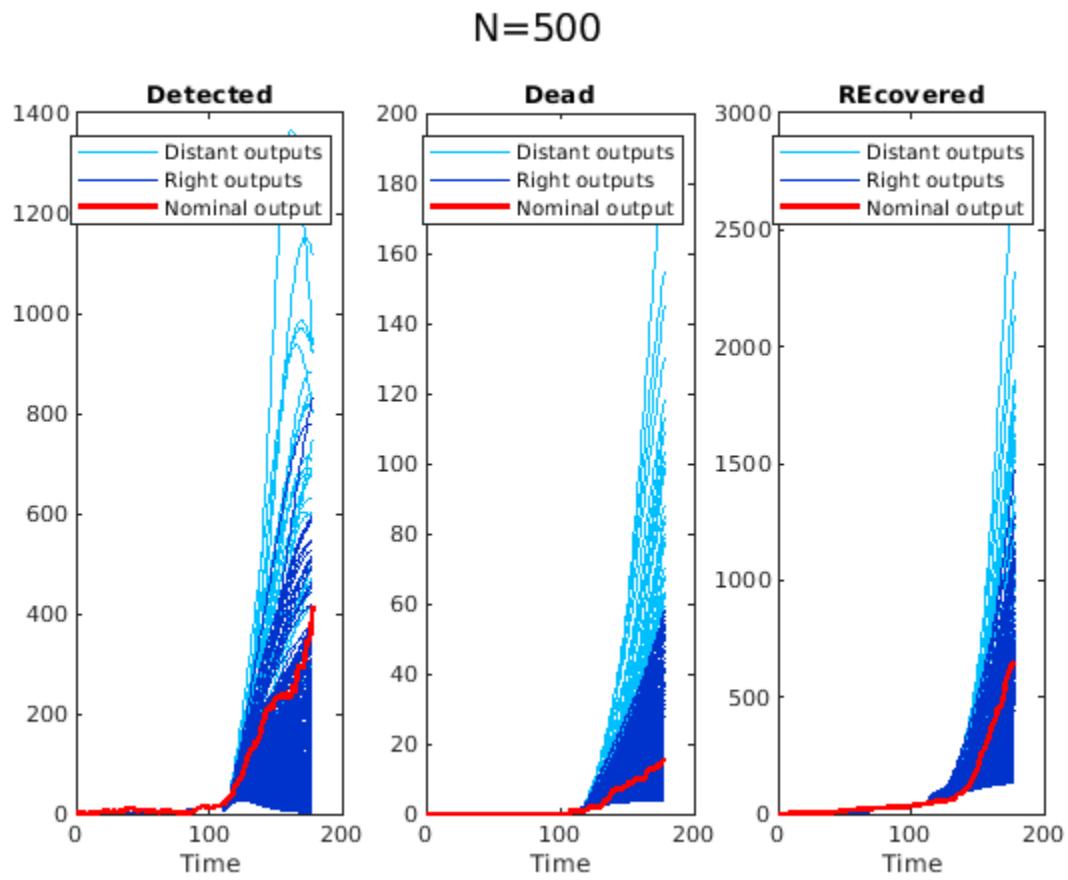
## 2.3. Identifiability analysis







## 2.4. Uncertainty analysis



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## Chapter 3. Extension number3

### 3.1. Basic information

The extension to be validated consists of the time series from the data179 to the 208. The status of the validation is: COMPLETED.

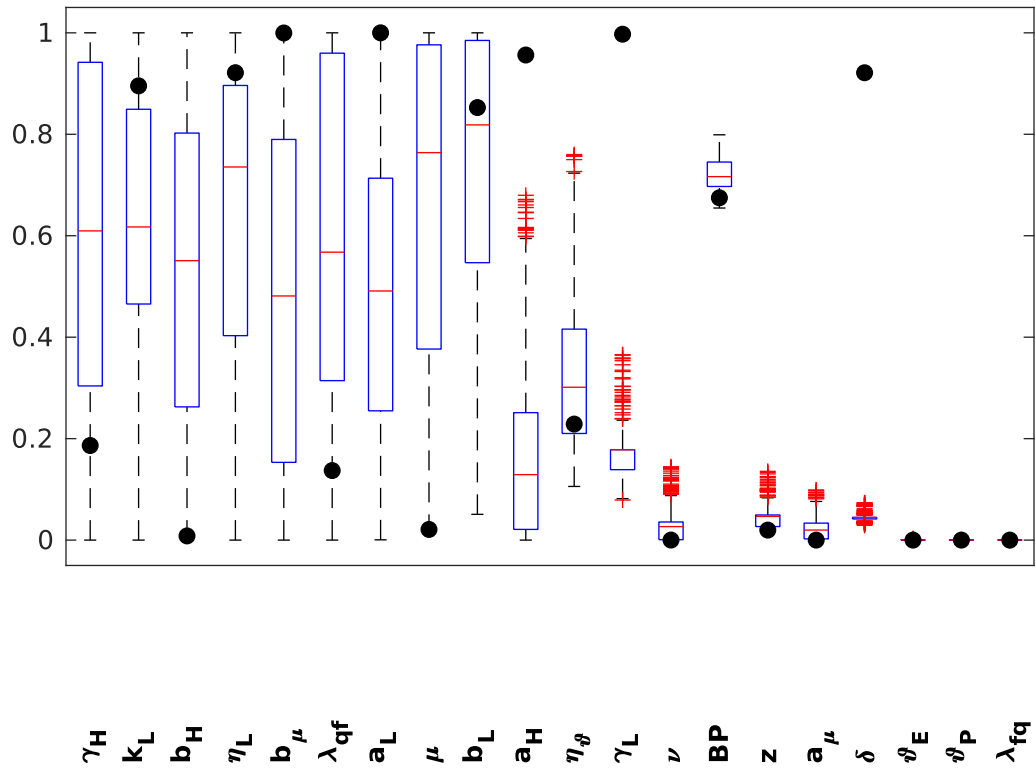
The number of estimations needed to perform the validation was1000.

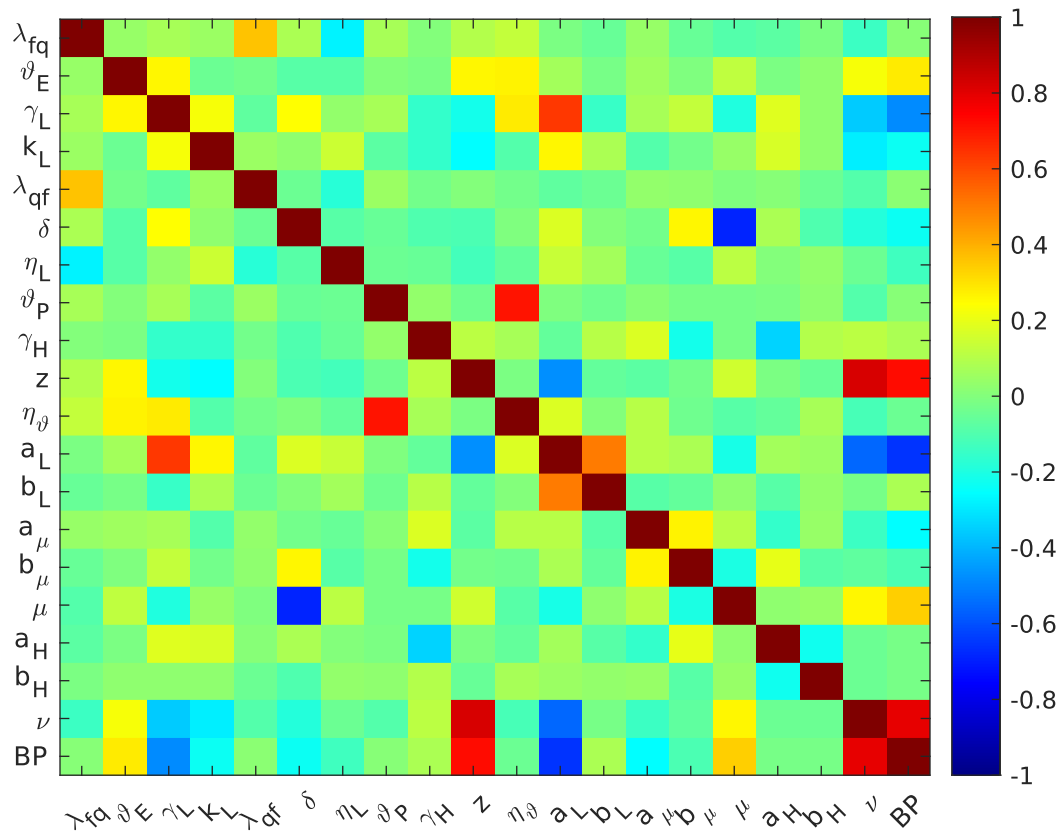
### 3.2. Estimated parameters with their intervals

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

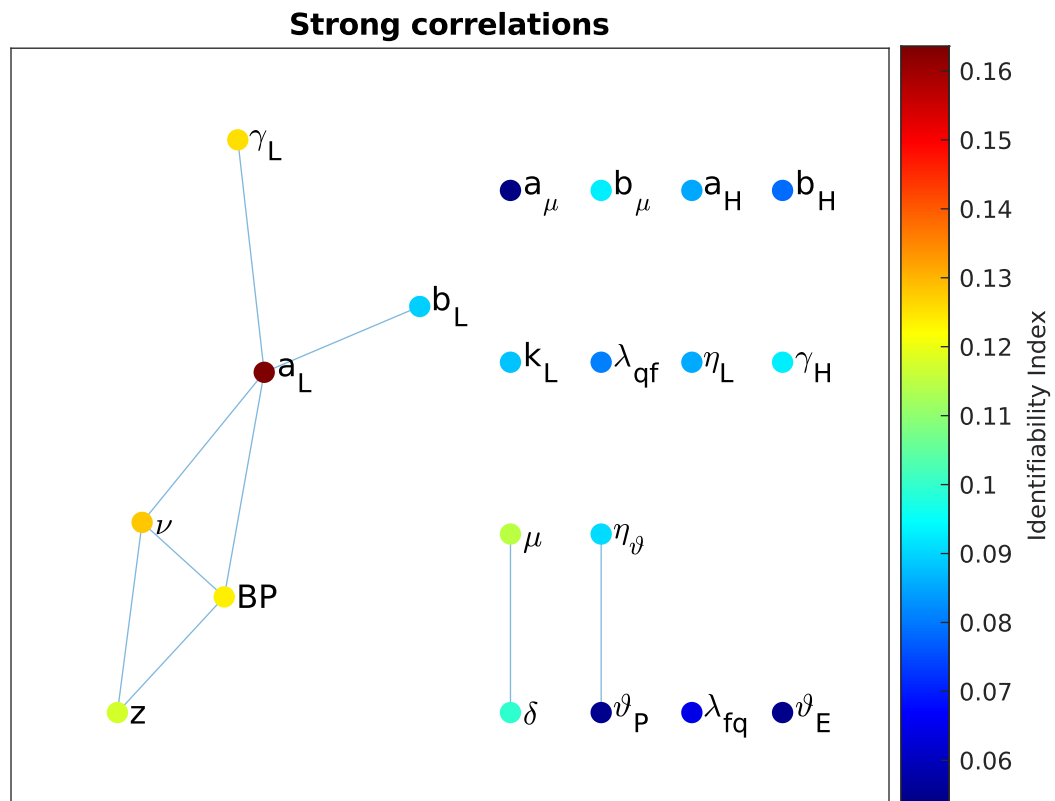
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0375'	'0'	'0'	'0.0646'
$\vartheta_E$	'0'	'0.0119'	'0.0005'	'0'	'0.0549'
$\gamma_L$	'0.1383'	'0.218'	'0.1782'	'0.9973'	'0.1257'
$k_L$	'6.2501'	'6.8619'	'6.556'	'9.0594'	'0.0881'
$\lambda_{qf}$	'0.5266'	'0.6086'	'0.5676'	'0.1371'	'0.0808'
$\delta$	'0.0022'	'0.0112'	'0.0067'	'0.1382'	'0.0997'
$\eta_L$	'0.6968'	'0.7743'	'0.7355'	'0.9214'	'0.0856'
$\vartheta_P$	'0'	'0.0008'	'0.0001'	'0'	'0.0551'
$\gamma_H$	'0.5655'	'0.6536'	'0.6095'	'0.1865'	'0.0931'
$z$	'0.7196'	'2.0812'	'1.4004'	'0.5919'	'0.1175'
$\eta_{\vartheta}$	'0.2774'	'0.3253'	'0.3013'	'0.2287'	'0.0908'
$a_L$	'7.3858'	'8.3654'	'7.8756'	'15'	'0.1636'
$b_L$	'11.9903'	'12.9278'	'12.459'	'12.9373'	'0.0895'
$a_{\mu}$	'1.2085'	'1.3461'	'1.2773'	'1.0004'	'0.0536'
$b_{\mu}$	'7.1253'	'8.3505'	'7.7379'	'14.9955'	'0.093'
$\mu$	'0.7211'	'0.8066'	'0.7638'	'0.021'	'0.1147'
$a_H$	'2.2694'	'3.3433'	'2.8063'	'14.388'	'0.0854'
$b_H$	'8.145'	'9.2786'	'8.7118'	'1.1155'	'0.0789'
$\nu$	'7.7678'	'18.8324'	'13.3001'	'0.0612'	'0.1284'
BP	'180.0394'	'180.9606'	'180.5'	'176.4552'	'0.1238'

### 3.3. Identifiability analysis

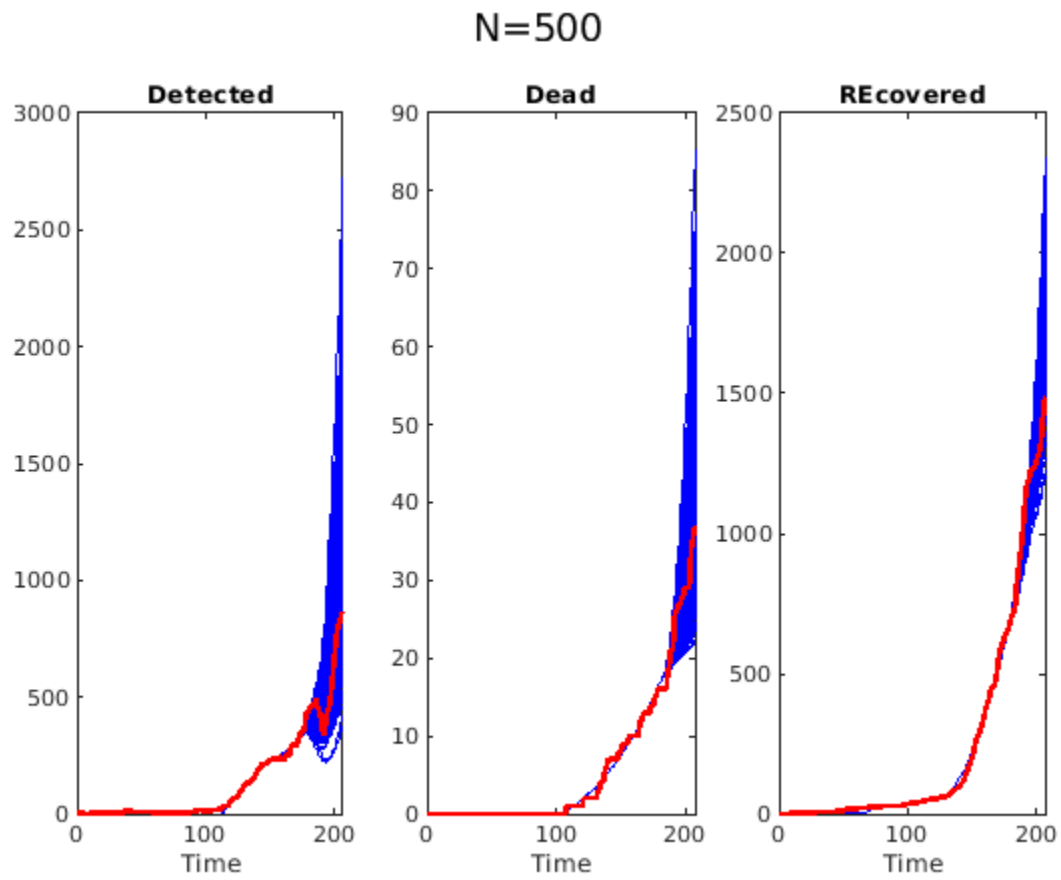








### 3.4. Uncertainty analysis



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## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data208 to the 235. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

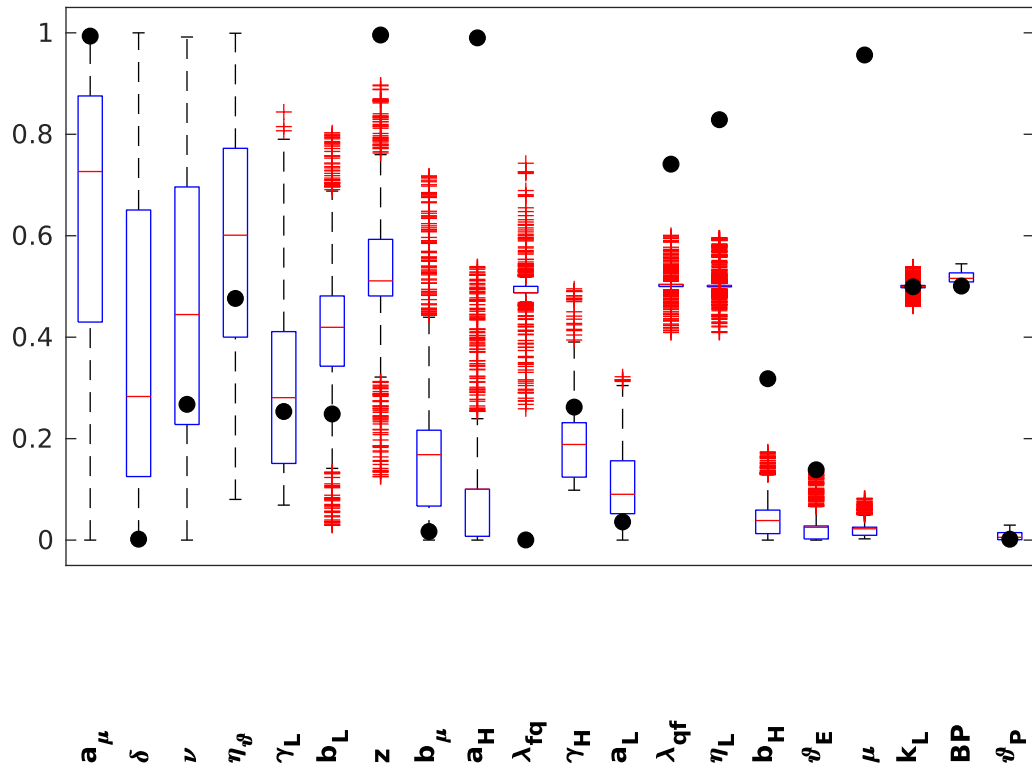
### 4.2. Estimated parameters with their intervals

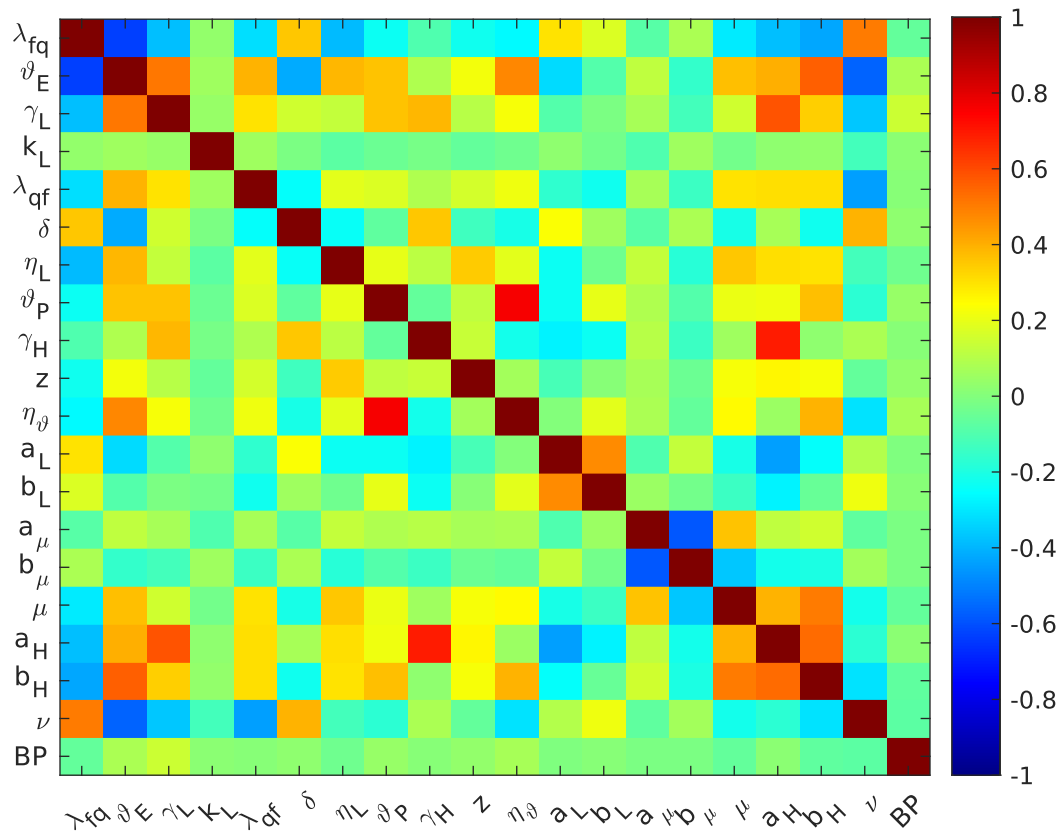
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

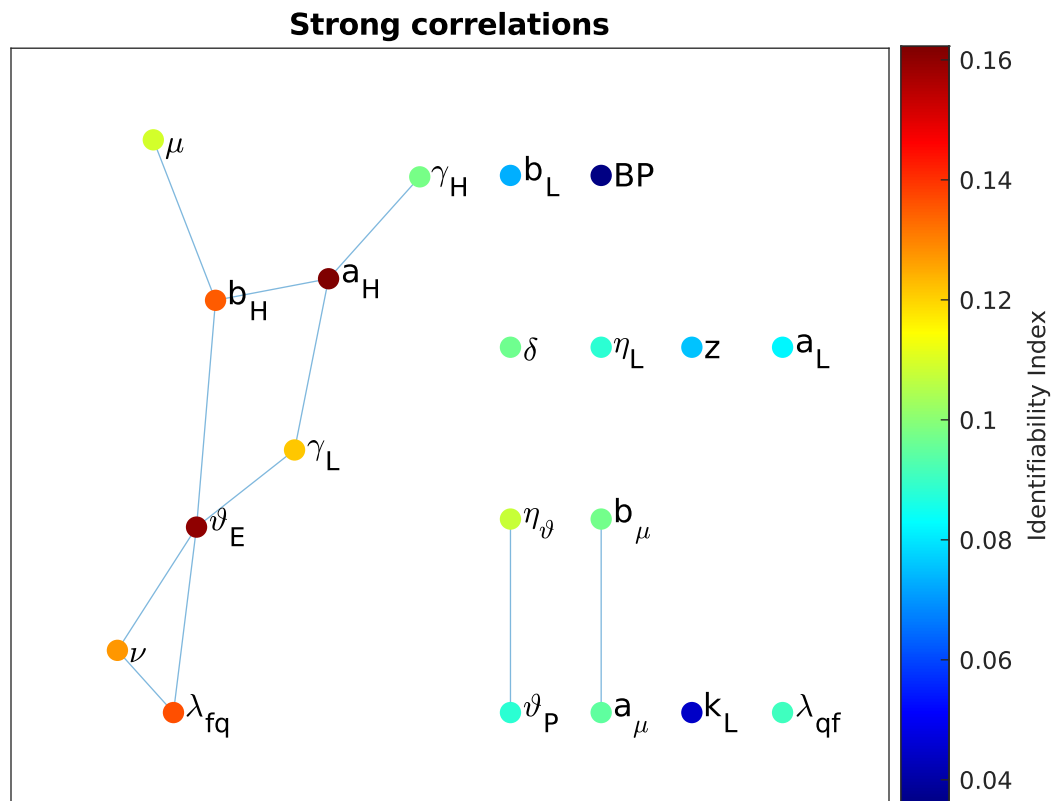
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0007'	'0.4876'	'0.0003'	'0.1364'
$\vartheta_E$	'0.1076'	'0.3033'	'0.0253'	'0.1386'	'0.16'
$\gamma_L$	'0.1486'	'0.286'	'0.2808'	'0.2535'	'0.1214'
$k_L$	'1'	'10'	'5.5002'	'5.4941'	'0.0445'
$\lambda_{qf}$	'0'	'0.96'	'0.5039'	'0.7411'	'0.091'
$\delta$	'0'	'0.0006'	'0.0425'	'0.0003'	'0.0969'
$\eta_L$	'0.025'	'1'	'0.5019'	'0.8287'	'0.0883'
$\vartheta_P$	'0.0006'	'0.0033'	'0.0055'	'0.0017'	'0.0884'
$\gamma_H$	'0.2465'	'0.4525'	'0.1885'	'0.2622'	'0.0977'
$z$	'2.07'	'30'	'15.3297'	'29.8713'	'0.0757'
$\eta_{\vartheta}$	'0.4635'	'0.7064'	'0.601'	'0.4764'	'0.1079'
$a_L$	'1.1298'	'4.1214'	'2.2646'	'1.5018'	'0.0818'
$b_L$	'2.6379'	'7.3985'	'6.8727'	'4.4813'	'0.0733'
$a_{\mu}$	'11.8739'	'15'	'11.172'	'14.9098'	'0.0949'
$b_{\mu}$	'1.0144'	'1.6863'	'3.3575'	'1.2367'	'0.0975'
$\mu$	'0.2771'	'1'	'0.0223'	'0.9563'	'0.1091'
$a_H$	'9.7209'	'15'	'2.4042'	'14.8612'	'0.1623'
$b_H$	'3.773'	'7.8181'	'1.5395'	'5.454'	'0.135'
$\nu$	'99.3003'	'415.2219'	'222.3086'	'133.8185'	'0.1275'
BP	'206.858'	'209.1001'	'207.8946'	'207.042'	'0.0359'

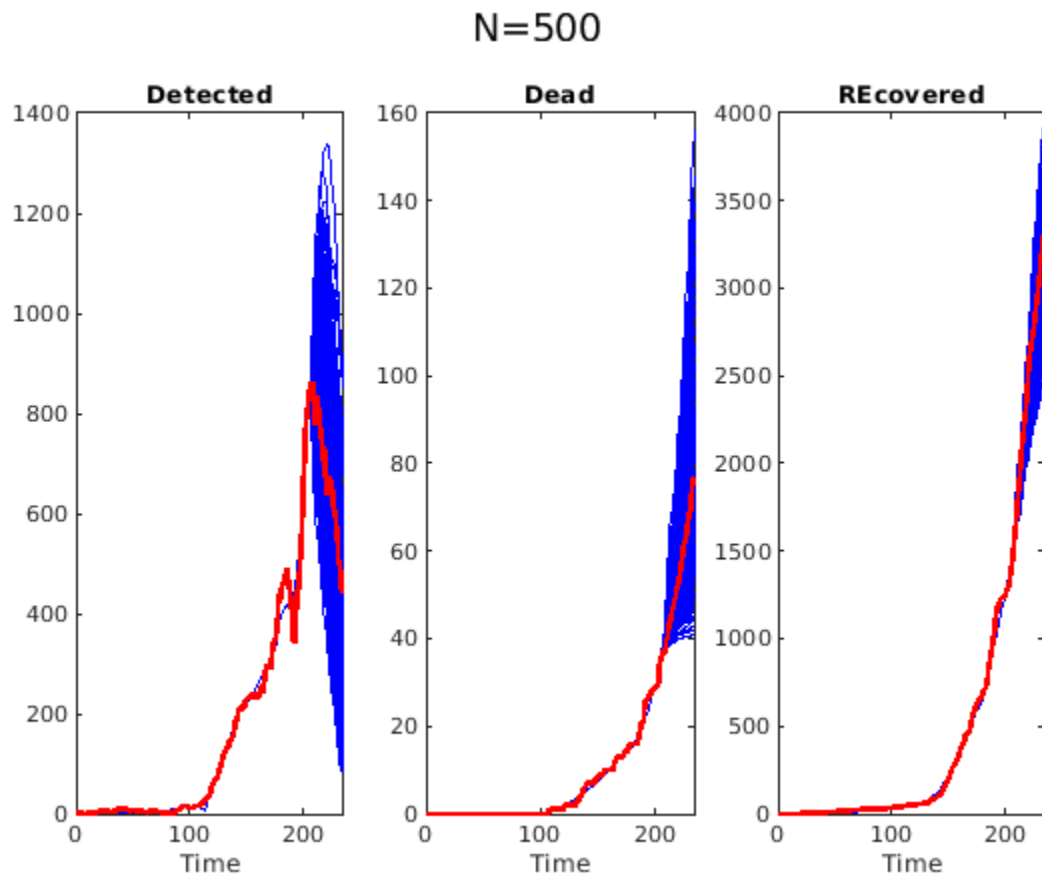
### 4.3. Identifiability analysis







#### 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 data235 to the 260. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

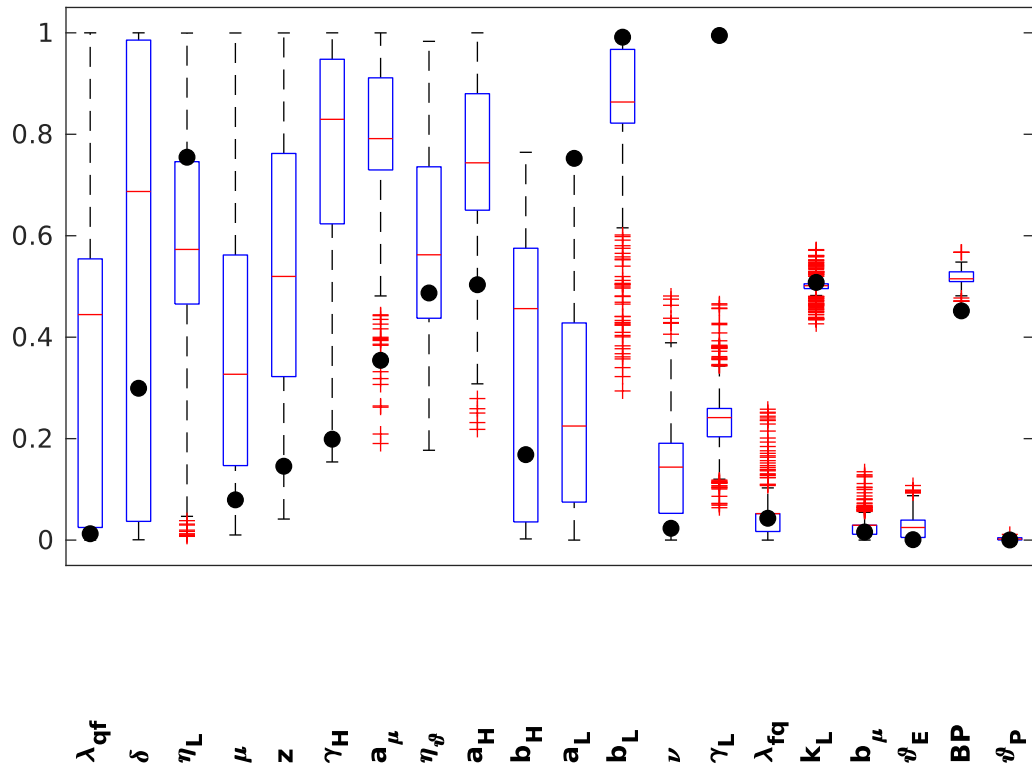
### 5.2. Estimated parameters with their intervals

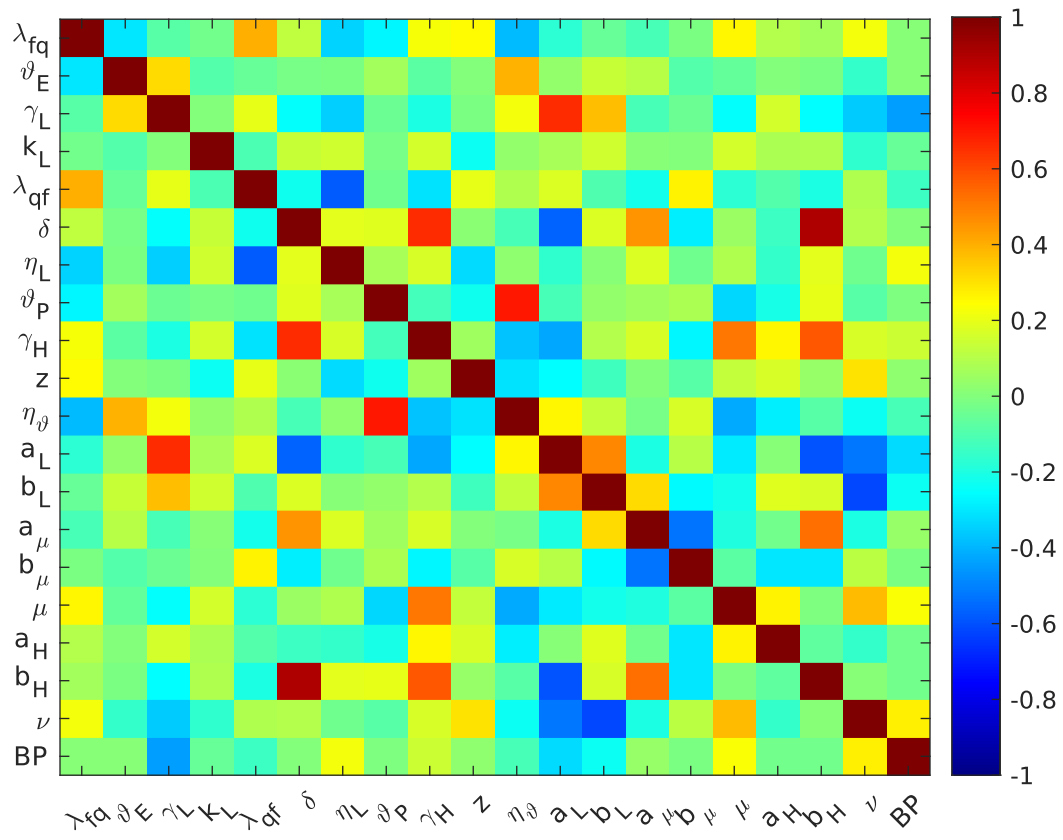
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

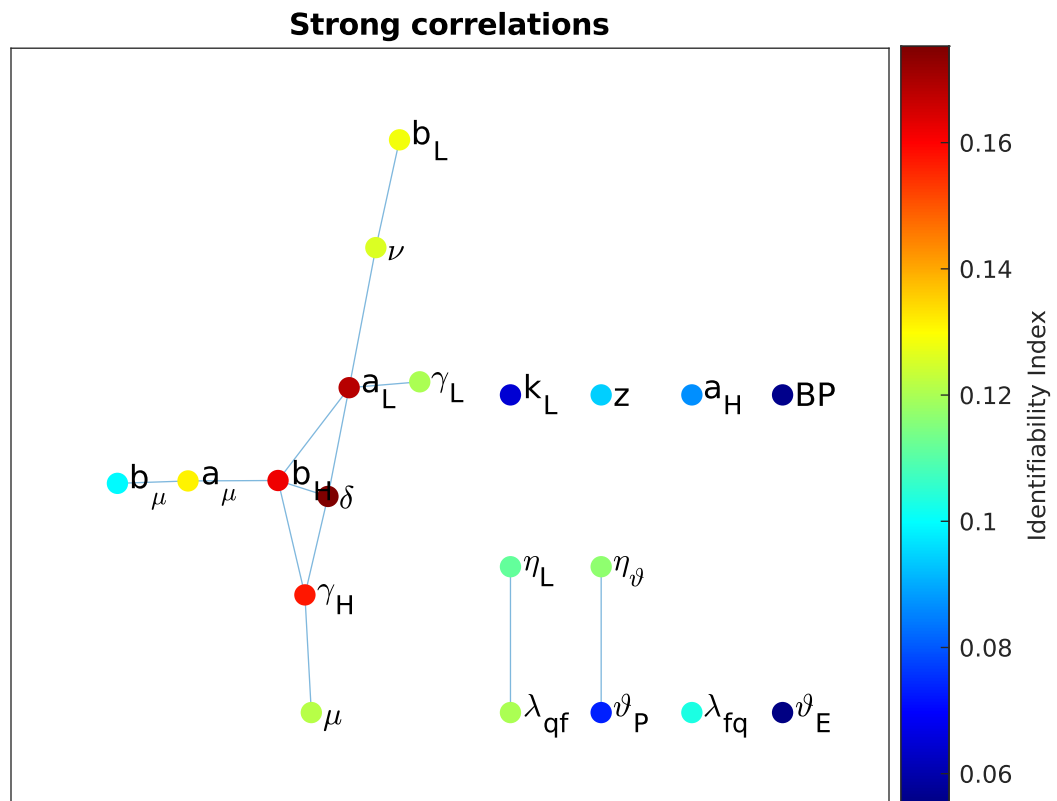
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0169'	'0.0875'	'0.0522'	'0.043'	'0.1032'
$\vartheta_E$	'0.0191'	'0.0307'	'0.0249'	'0.0008'	'0.0552'
$\gamma_L$	'0.2128'	'0.2706'	'0.2417'	'0.9947'	'0.1203'
$k_L$	'5.3508'	'5.6758'	'5.5133'	'5.572'	'0.0649'
$\lambda_{qf}$	'0.4075'	'0.4816'	'0.4446'	'0.0126'	'0.12'
$\delta$	'0.0947'	'0.1114'	'0.1031'	'0.0449'	'0.1753'
$\eta_L$	'0.5401'	'0.6059'	'0.573'	'0.7547'	'0.1118'
$\vartheta_P$	'0.0015'	'0.0028'	'0.0021'	'0.0003'	'0.0739'
$\gamma_H$	'0.7959'	'0.8612'	'0.8285'	'0.1989'	'0.1571'
$z$	'14.5491'	'16.6376'	'15.5933'	'4.3687'	'0.0945'
$\eta_{\vartheta}$	'0.5374'	'0.5875'	'0.5624'	'0.4871'	'0.117'
$a_L$	'3.79'	'4.5064'	'4.1482'	'11.5355'	'0.1683'
$b_L$	'12.4852'	'13.69'	'13.0876'	'14.8798'	'0.1287'
$a_{\mu}$	'11.5405'	'12.6114'	'12.076'	'5.9612'	'0.1314'
$b_{\mu}$	'1.0771'	'1.7442'	'1.4106'	'1.223'	'0.0993'
$\mu$	'0.2941'	'0.3598'	'0.3269'	'0.0794'	'0.1214'
$a_H$	'11.0023'	'11.7956'	'11.3989'	'8.0481'	'0.087'
$b_H$	'6.9303'	'7.8468'	'7.3886'	'3.3584'	'0.1618'
$\nu$	'60.0499'	'84.043'	'72.0465'	'11.643'	'0.1258'
BP	'234.6786'	'234.8945'	'234.7865'	'231.4997'	'0.0564'



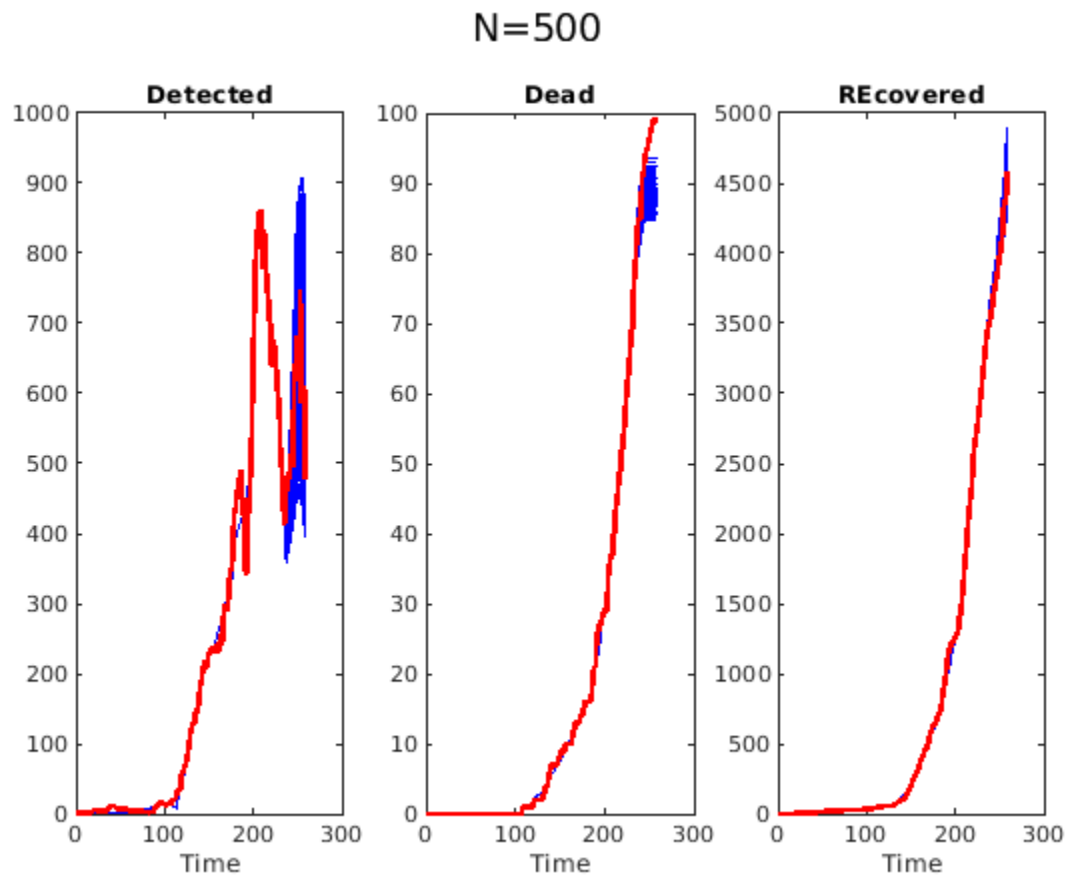
### 5.3. Identifiability analysis







## 5.4. Uncertainty analysys



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## Chapter 6. Extension number6

### 6.1. Basic information

The extension to be validated consists of the time series from the data260 to the 290. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

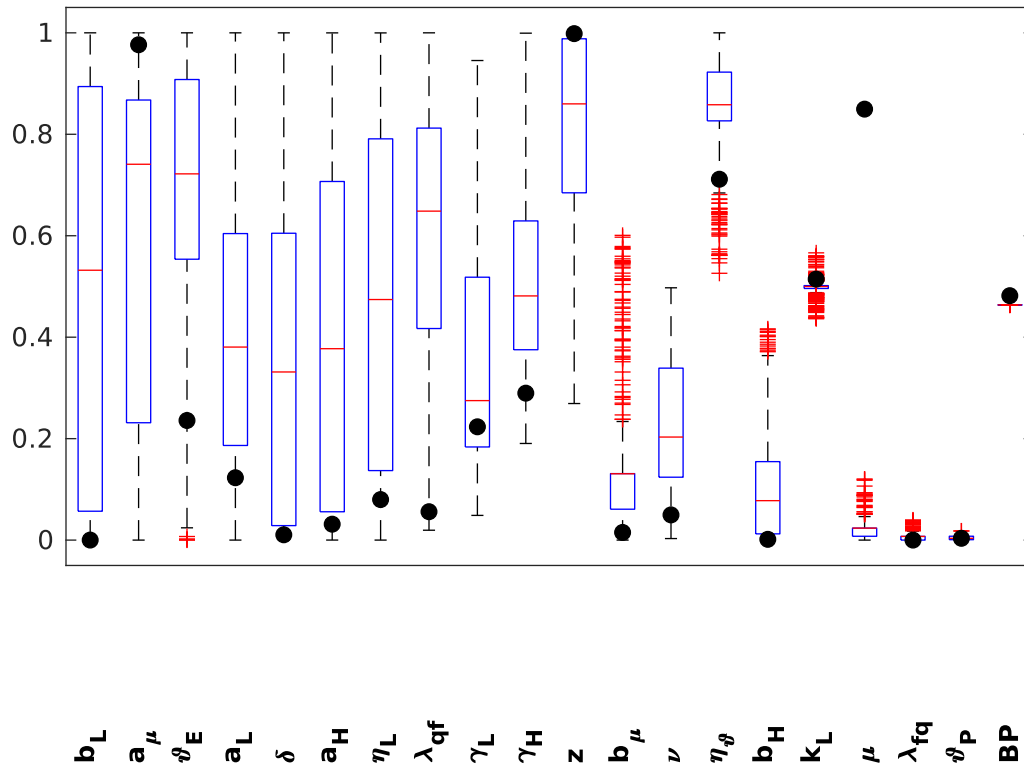
### 6.2. Estimated parameters with their intervals

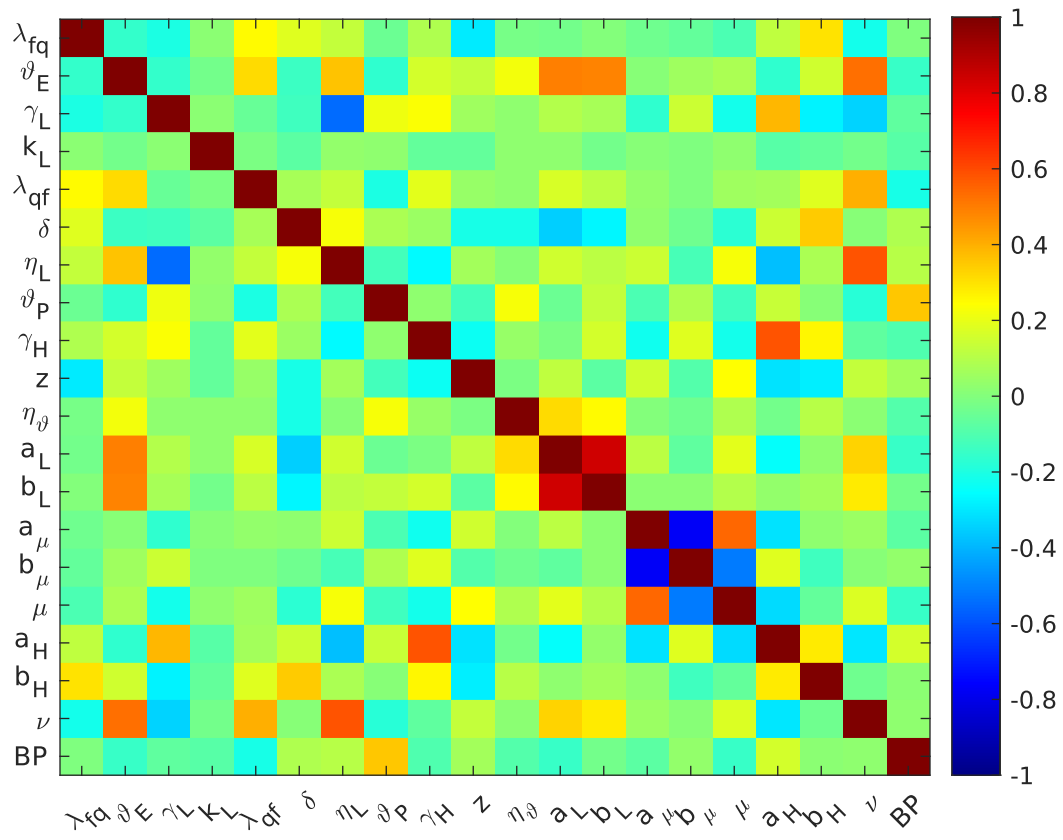
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

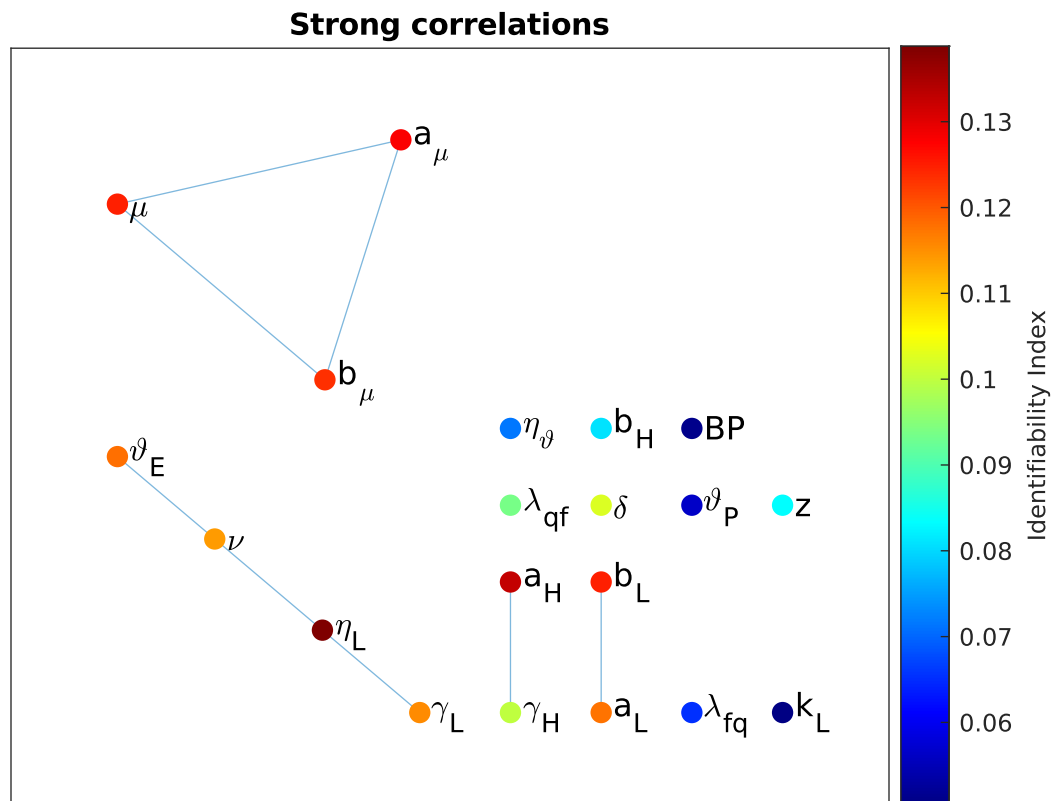
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0365'	'0.0073'	'0'	'0.0656'
$\vartheta_E$	'0.2311'	'0.3387'	'0.722'	'0.2358'	'0.1179'
$\gamma_L$	'0.2034'	'0.2237'	'0.275'	'0.2233'	'0.1156'
$k_L$	'1'	'10'	'5.4994'	'5.6302'	'0.0505'
$\lambda_{qf}$	'0.0425'	'0.0892'	'0.6485'	'0.056'	'0.0939'
$\delta$	'0'	'0.0035'	'0.0497'	'0.0016'	'0.1023'
$\eta_L$	'0.0045'	'0.1798'	'0.4742'	'0.0799'	'0.1388'
$\vartheta_P$	'0.0035'	'0.0045'	'0.0036'	'0.0035'	'0.0564'
$\gamma_H$	'0.2817'	'0.8649'	'0.4814'	'0.2897'	'0.1'
$z$	'11.863'	'30'	'25.7964'	'29.9521'	'0.0835'
$\eta_{\vartheta}$	'0.6872'	'0.712'	'0.858'	'0.7114'	'0.0716'
$a_L$	'2.7205'	'2.889'	'6.3274'	'2.7213'	'0.1175'
$b_L$	'1'	'1.0334'	'8.448'	'1.001'	'0.1249'
$a_{\mu}$	'9.4587'	'15'	'11.3728'	'14.6712'	'0.1279'
$b_{\mu}$	'1'	'2.6938'	'2.8352'	'1.2114'	'0.1234'
$\mu$	'0'	'0.864'	'0.0237'	'0.8496'	'0.1248'
$a_H$	'1.4221'	'3.9346'	'6.2824'	'1.4392'	'0.1329'
$b_H$	'1'	'1.8976'	'2.0898'	'1.0213'	'0.0812'
$\nu$	'18.1296'	'35.6886'	'101.6837'	'24.8386'	'0.114'
BP	'261.5'	'263.2345'	'260.5'	'261.5'	'0.0515'

### 6.3. Identifiability analysis

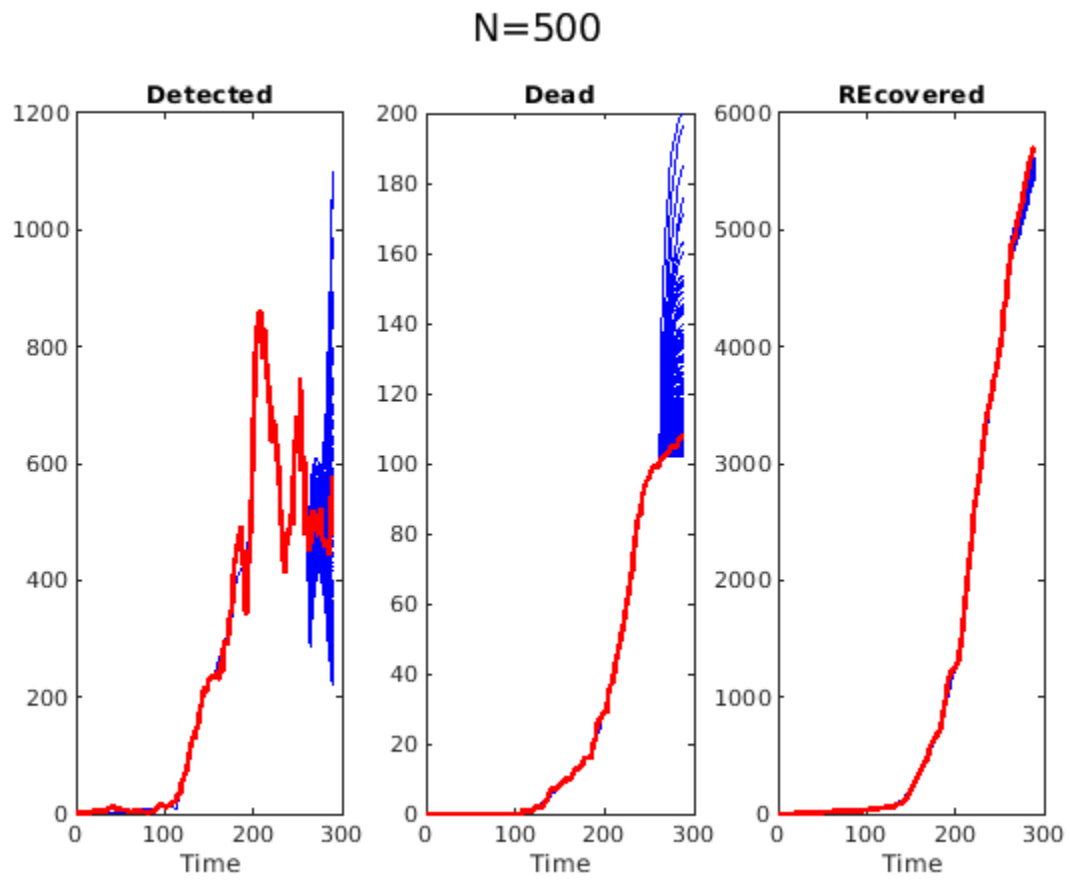








## 6.4. Uncertainty analysys



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## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data290 to the 329. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

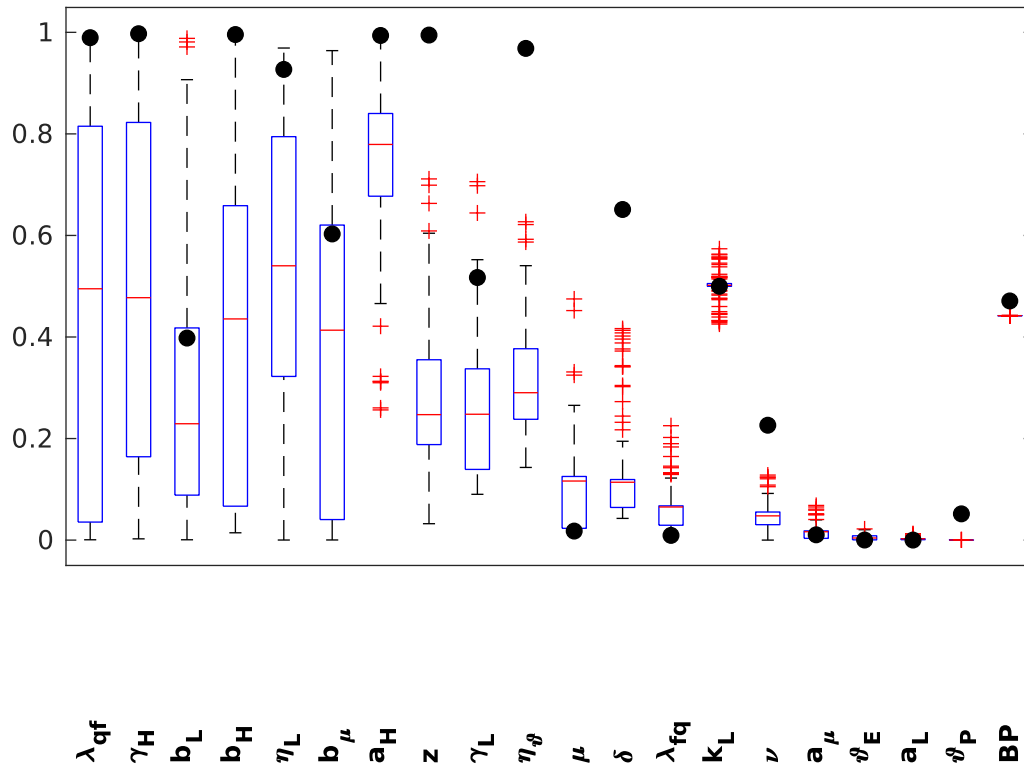
### 7.2. Estimated parameters with their intervals

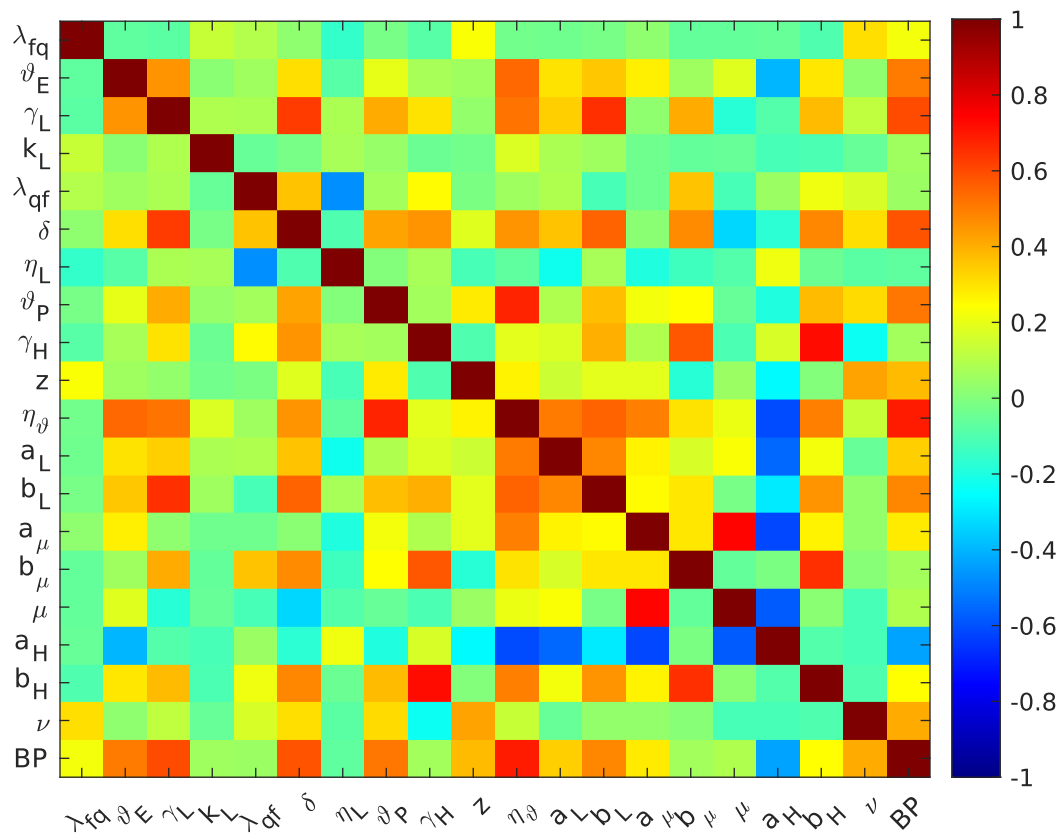
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

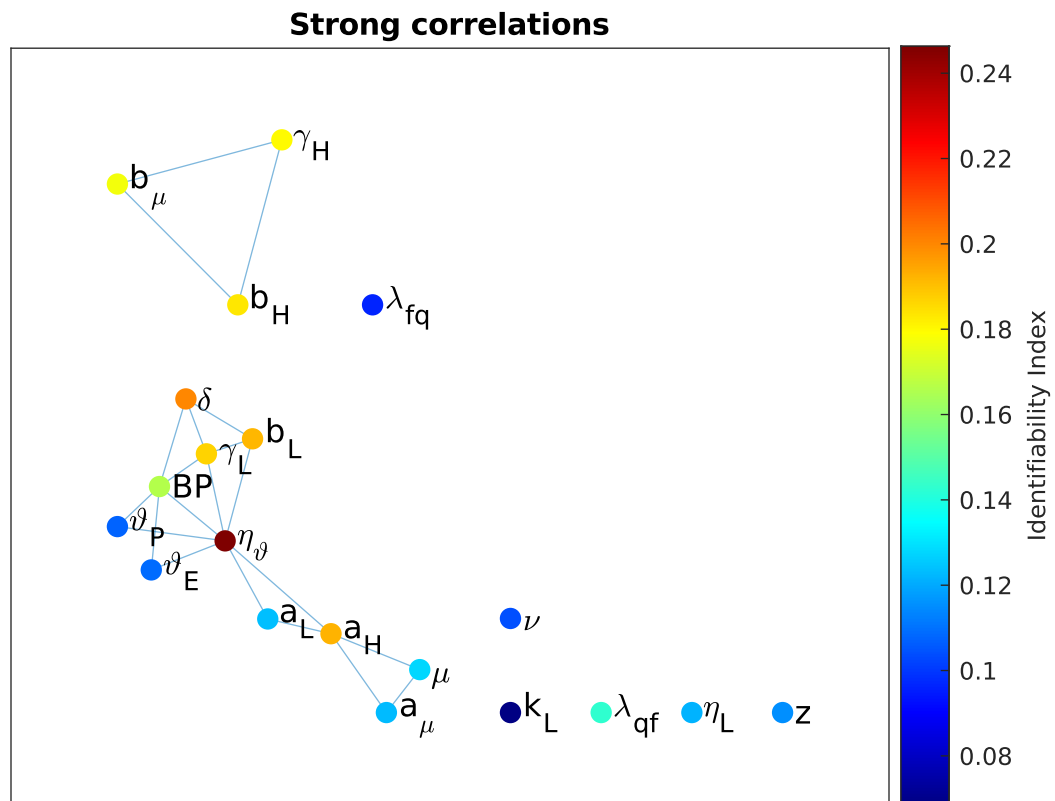
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0004'	'0.0201'	'0.0652'	'0.0093'	'0.0966'
$\vartheta_E$	'0'	'0.0003'	'0.0045'	'0.0001'	'0.109'
$\gamma_L$	'0.5159'	'0.8001'	'0.2479'	'0.5171'	'0.187'
$k_L$	'1'	'10'	'5.516'	'5.4989'	'0.0687'
$\lambda_{qf}$	'0'	'1'	'0.495'	'0.9895'	'0.1431'
$\delta$	'0.0766'	'0.1415'	'0.0179'	'0.0977'	'0.2001'
$\eta_L$	'0.1186'	'1'	'0.5402'	'0.927'	'0.1217'
$\vartheta_P$	'0.024'	'0.0981'	'0.0002'	'0.0517'	'0.1082'
$\gamma_H$	'0.19'	'1'	'0.4774'	'0.9973'	'0.1799'
$z$	'0'	'30'	'7.4391'	'29.8389'	'0.1154'
$\eta_{\vartheta}$	'0.5311'	'0.9737'	'0.2921'	'0.9684'	'0.2463'
$a_L$	'1'	'1.2666'	'1.0359'	'1.0011'	'0.1238'
$b_L$	'5.6688'	'8.4769'	'4.2083'	'6.5708'	'0.1919'
$a_{\mu}$	'1'	'13.096'	'1.2339'	'1.1457'	'0.1231'
$b_{\mu}$	'1'	'15'	'6.7877'	'9.4413'	'0.1771'
$\mu$	'0'	'0.029'	'0.1168'	'0.0178'	'0.1281'
$a_H$	'9.1424'	'15'	'11.9082'	'14.9135'	'0.1924'
$b_H$	'6.7331'	'15'	'7.0983'	'14.9394'	'0.1832'
$\nu$	'69.4113'	'500'	'24.0435'	'113.1173'	'0.1041'
BP	'291.6306'	'295.2447'	'290.5'	'292.5'	'0.1662'

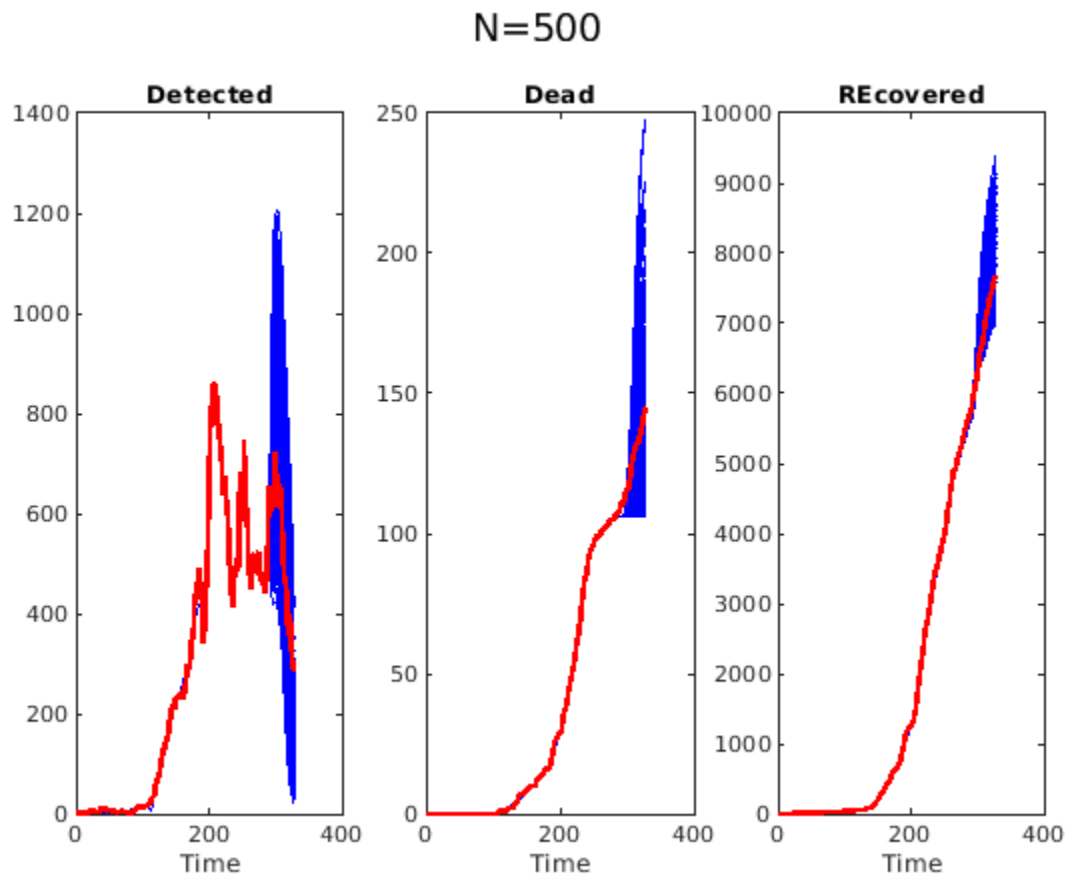
### 7.3. Identifiability analysis







## 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 data329 to the 345. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

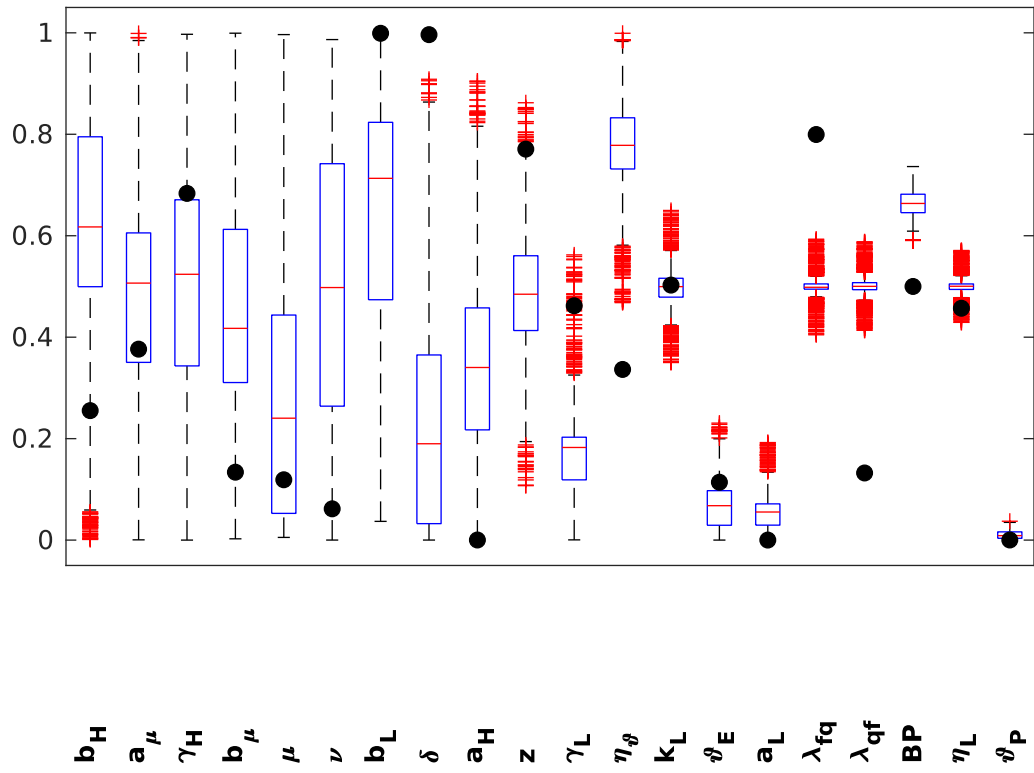
### 8.2. Estimated parameters with their intervals

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

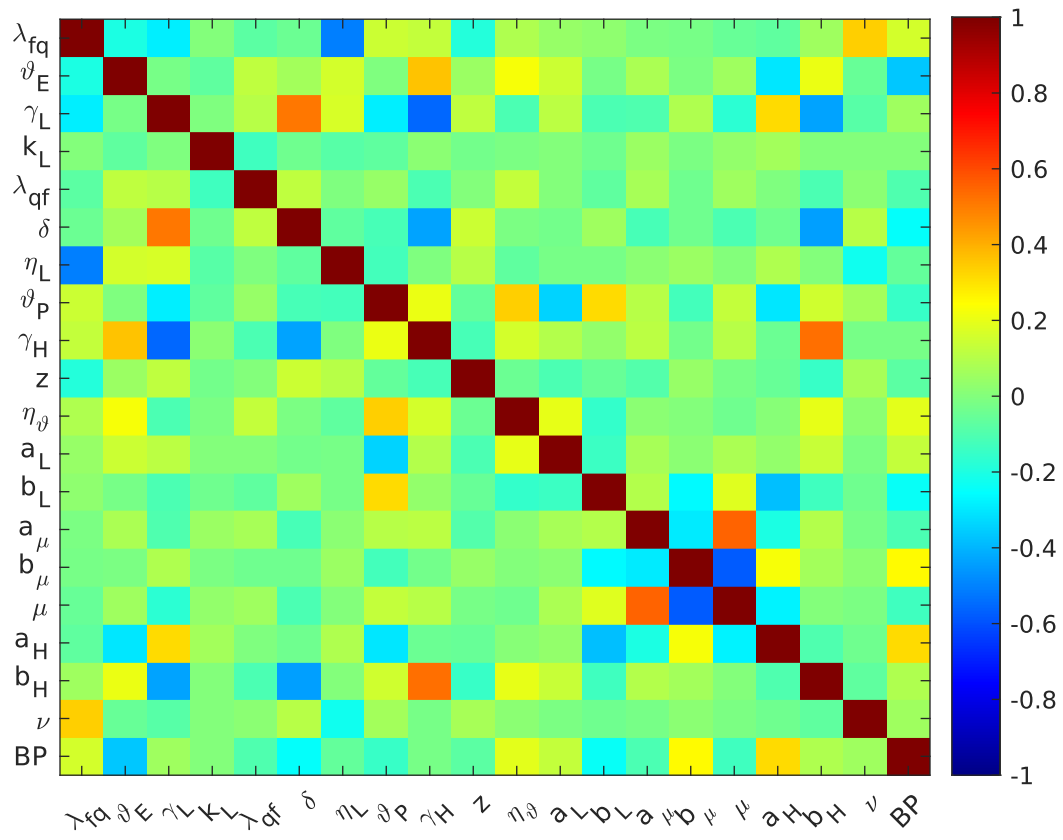
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

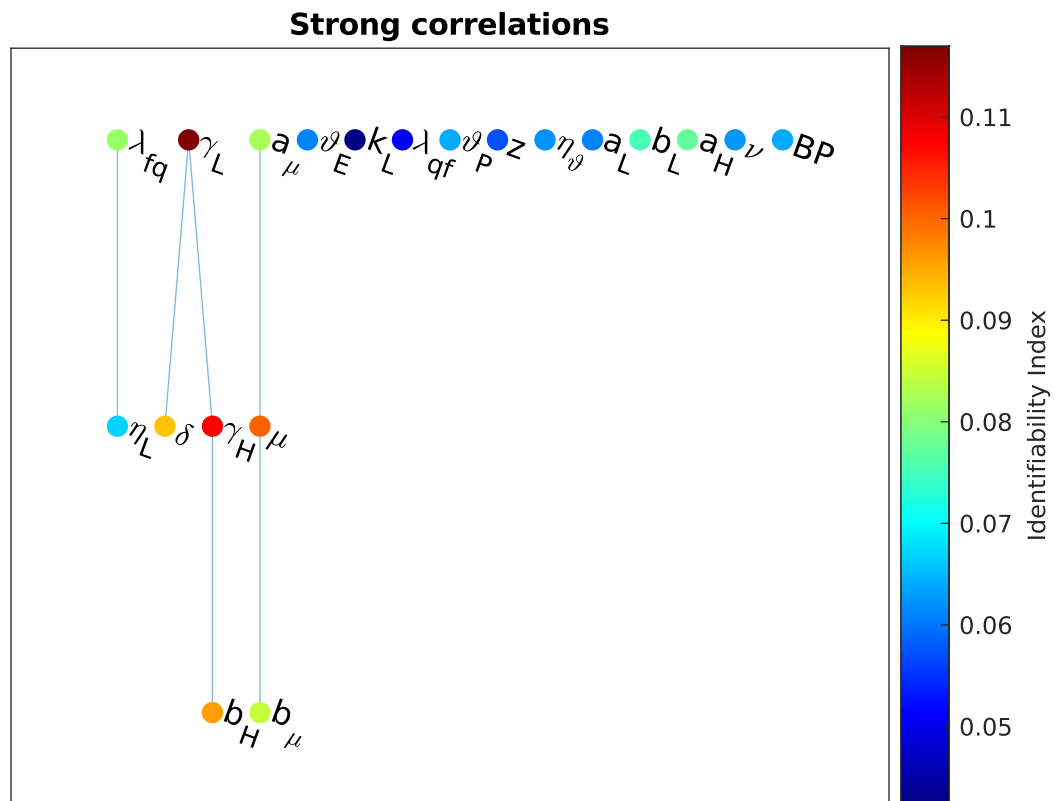
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.1429'	'1'	'0.4984'	'0.7995'	'0.0813'
$\vartheta_E$	'0.0055'	'0.2087'	'0.0679'	'0.1141'	'0.0612'
$\gamma_L$	'0.3785'	'0.462'	'0.1826'	'0.4619'	'0.117'
$k_L$	'1'	'9.55'	'5.4969'	'5.5241'	'0.0424'
$\lambda_{qf}$	'0'	'0.2828'	'0.5002'	'0.1323'	'0.051'
$\delta$	'0.015'	'0.15'	'0.0286'	'0.1495'	'0.0931'
$\eta_L$	'0'	'0.96'	'0.5004'	'0.457'	'0.0669'
$\vartheta_P$	'0.0002'	'0.0013'	'0.0088'	'0.0002'	'0.064'
$\gamma_H$	'0.3867'	'1'	'0.524'	'0.6834'	'0.1075'
$z$	'0'	'24.6924'	'14.5409'	'23.1221'	'0.0575'
$\eta_{\vartheta}$	'0.282'	'0.3835'	'0.7782'	'0.3364'	'0.0622'
$a_L$	'1'	'1.1679'	'1.777'	'1.0009'	'0.0611'
$b_L$	'12.2205'	'15'	'10.9832'	'14.9868'	'0.0754'
$a_{\mu}$	'3.383'	'15'	'8.0926'	'6.2699'	'0.0824'
$b_{\mu}$	'1.35'	'15'	'6.8437'	'2.8741'	'0.0845'
$\mu$	'0'	'0.2087'	'0.2403'	'0.1189'	'0.1003'
$a_H$	'1'	'2.3809'	'5.7661'	'1.0026'	'0.0774'
$b_H$	'2.5839'	'13.312'	'9.6429'	'4.5734'	'0.0958'
$\nu$	'26.9752'	'130.7419'	'248.9285'	'30.8247'	'0.0627'
BP	'316.9966'	'329.2294'	'326.5'	'317.5'	'0.0641'

## 8.3. Identifiability analysys

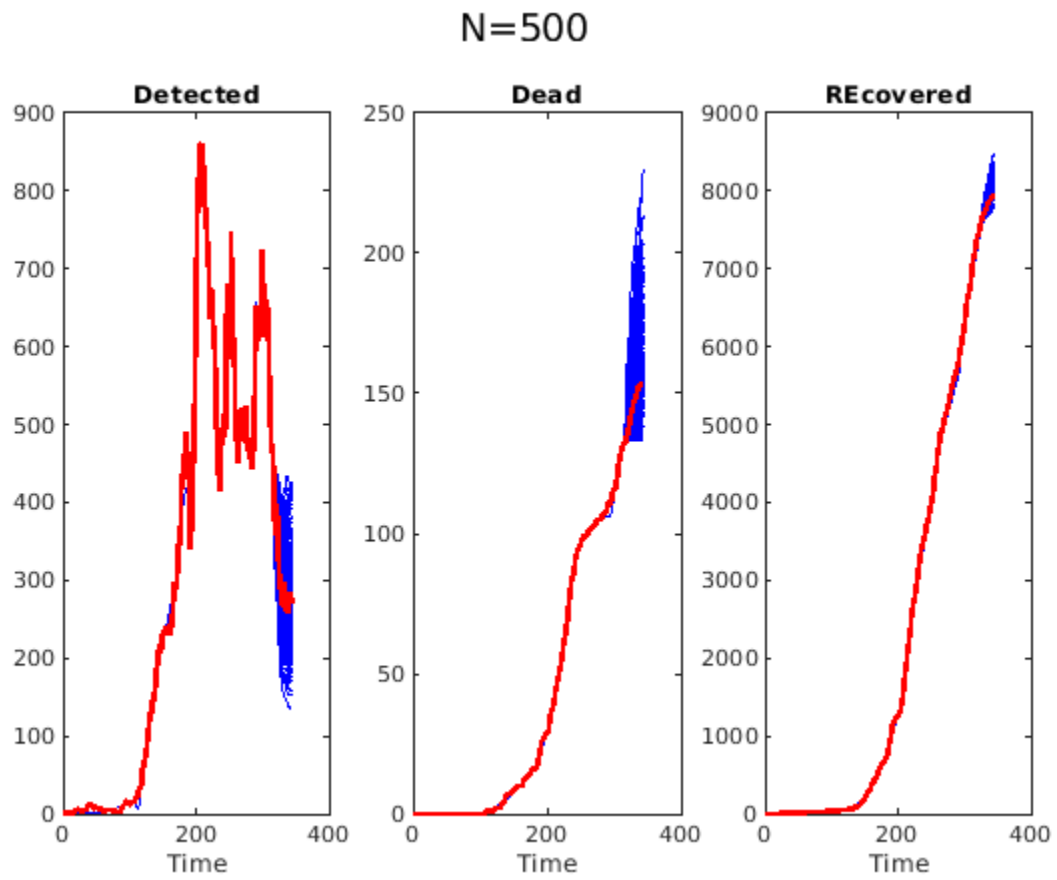








## 8.4. Uncertainty analysis



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## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data345 to the 398. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

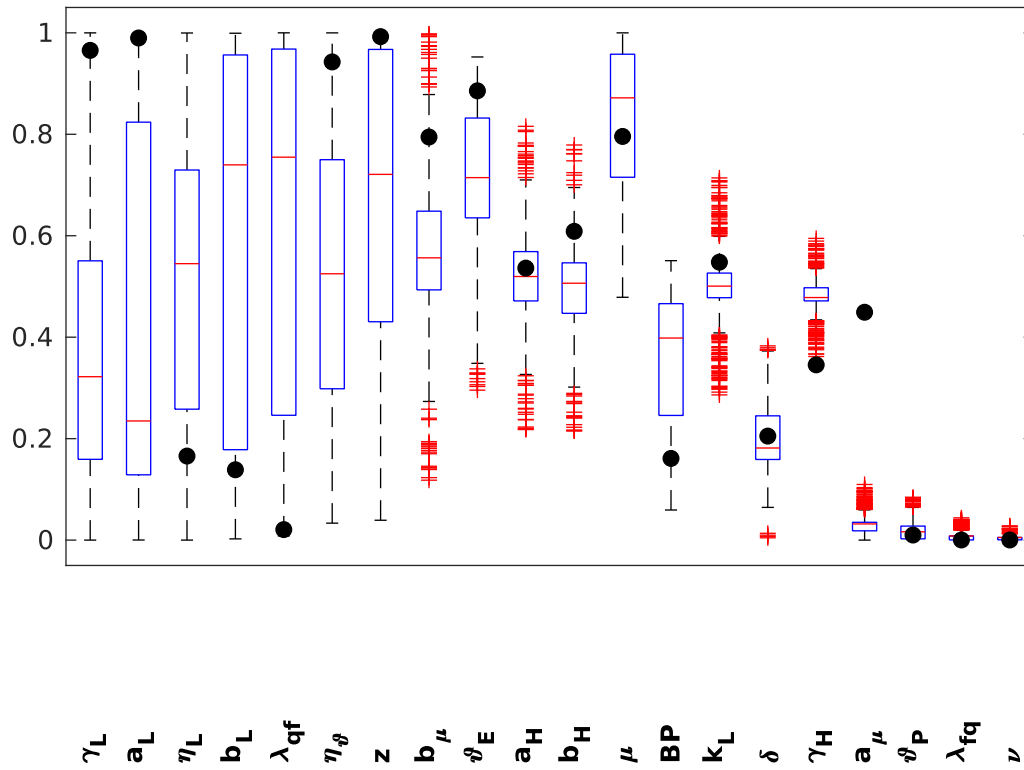
### 9.2. Estimated parameters with their intervals

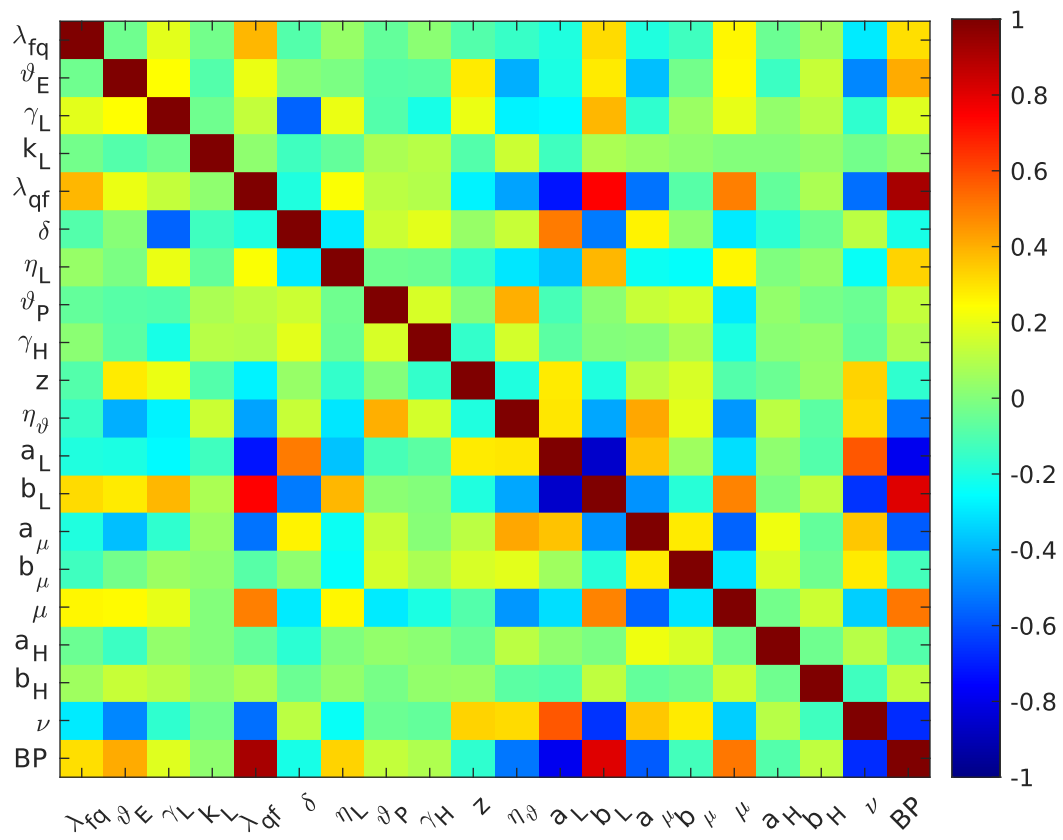
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

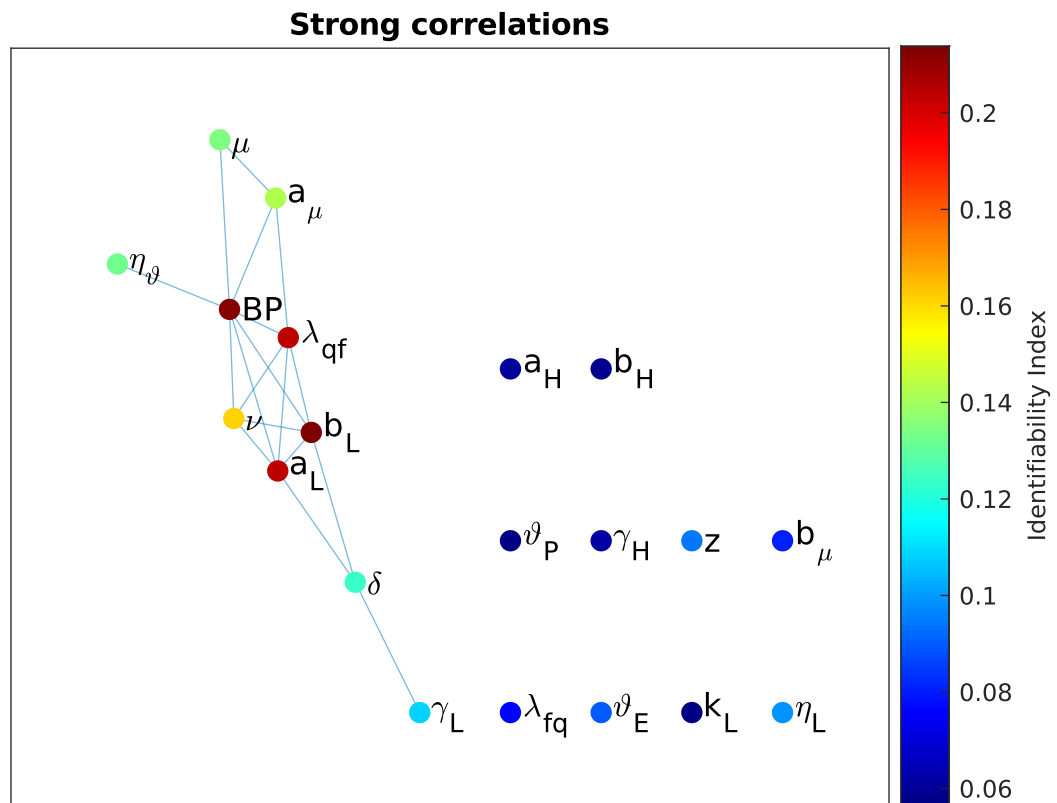
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0002'	'0.0006'	'0.0081'	'0.0003'	'0.0766'
\vartheta_E	'0.8723'	'0.8865'	'0.7138'	'0.8857'	'0.09'
\gamma_L	'0.1576'	'1'	'0.3221'	'0.9654'	'0.1086'
k_L	'1.18'	'10'	'5.5061'	'5.9308'	'0.0567'
\lambda_{qf}	'0.0207'	'0.0251'	'0.7549'	'0.0207'	'0.204'
\delta	'0'	'0.0692'	'0.0273'	'0.0308'	'0.124'
\eta_L	'0.1568'	'0.1749'	'0.545'	'0.1657'	'0.0985'
\vartheta_P	'0'	'0.0166'	'0.0164'	'0.01'	'0.0574'
\gamma_H	'0.0185'	'0.6341'	'0.4782'	'0.3455'	'0.0622'
z	'26.8451'	'29.8423'	'21.6284'	'29.7743'	'0.0945'
\eta_{\vartheta}	'0.6597'	'1'	'0.525'	'0.9426'	'0.1324'
a_L	'10.0319'	'15'	'4.2881'	'14.8579'	'0.2039'
b_L	'2.4352'	'7.4615'	'11.3558'	'2.9412'	'0.2138'
a_{\mu}	'1.56'	'15'	'1.4469'	'7.2884'	'0.1425'
b_{\mu}	'1'	'13.88'	'8.7905'	'12.1246'	'0.0808'
\mu	'0.02'	'0.9608'	'0.8718'	'0.7958'	'0.1348'
a_H	'1.28'	'15'	'8.2747'	'8.5069'	'0.0605'
b_H	'1'	'15'	'8.0893'	'9.5218'	'0.0587'
\nu	'0.0134'	'0.2906'	'2.6048'	'0.1343'	'0.1611'
BP	'336.8493'	'338.5152'	'352.5'	'338.4998'	'0.2123'

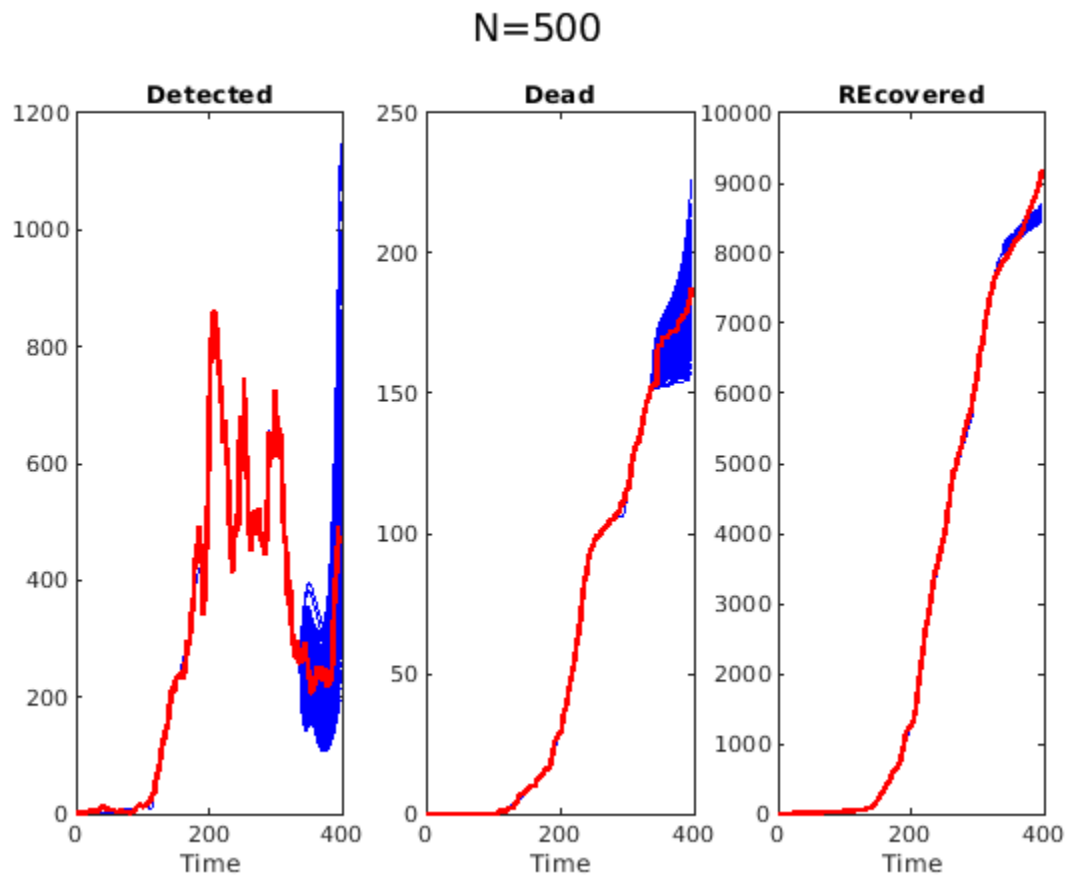
### 9.3. Identifiability analysis







## 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 data398 to the 398. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

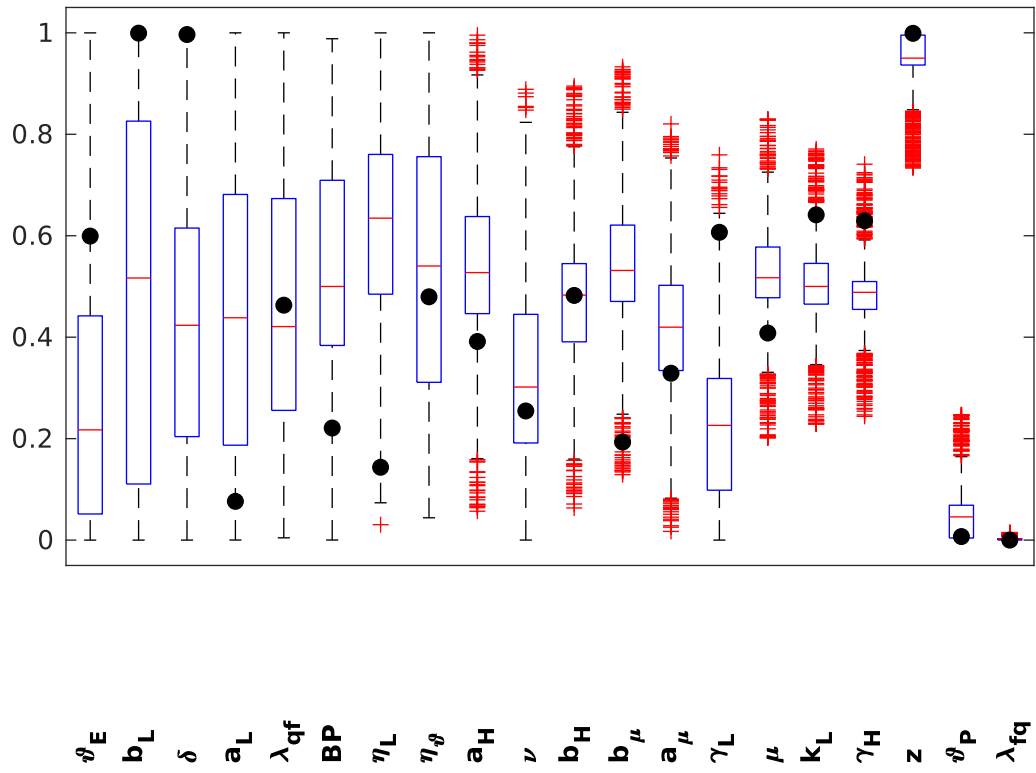
### 10.2. Estimated parameters with their intervals

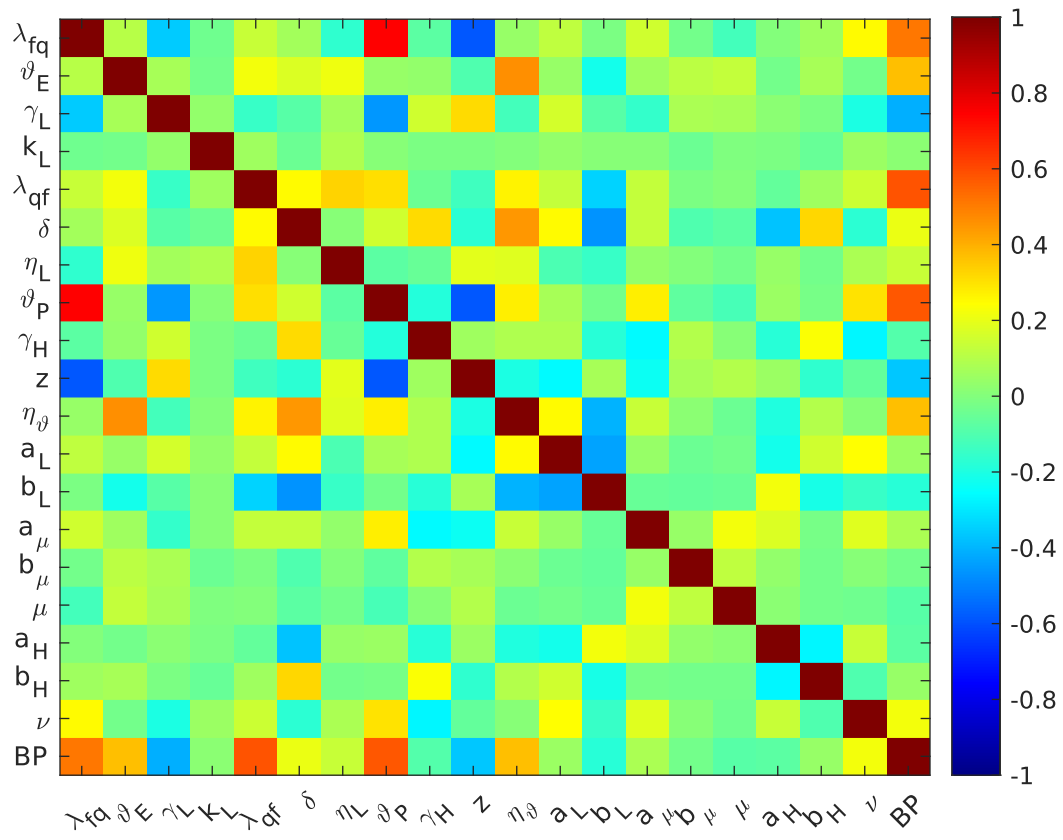
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

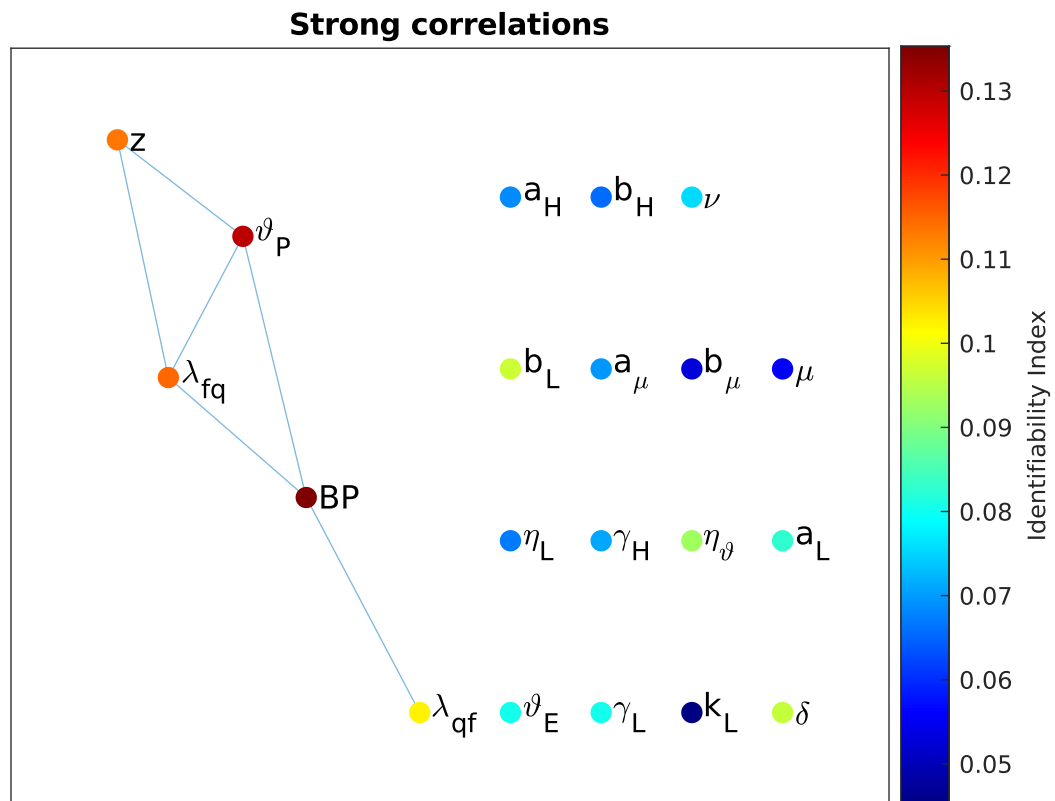
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0.0028'	'0'	'0.1147'
$\vartheta_E$	'0.4195'	'0.899'	'0.2173'	'0.5993'	'0.0805'
$\gamma_L$	'0.4247'	'0.9102'	'0.2261'	'0.6068'	'0.0804'
$k_L$	'4.7396'	'10'	'5.5002'	'6.7709'	'0.0452'
$\lambda_{qf}$	'0.3242'	'0.6947'	'0.4209'	'0.4631'	'0.1023'
$\delta$	'0.1046'	'0.15'	'0.0635'	'0.1495'	'0.096'
$\eta_L$	'0.1005'	'0.2153'	'0.6346'	'0.1436'	'0.0673'
$\vartheta_P$	'0.0049'	'0.0105'	'0.0457'	'0.007'	'0.1297'
$\gamma_H$	'0.4406'	'0.9442'	'0.4884'	'0.6295'	'0.071'
$z$	'20.979'	'30'	'28.5034'	'29.9699'	'0.1135'
$\eta_{\vartheta}$	'0.3357'	'0.7194'	'0.5404'	'0.4796'	'0.0929'
$a_L$	'1.4484'	'3.1038'	'7.1362'	'2.0692'	'0.083'
$b_L$	'10.4937'	'15'	'8.2334'	'14.9911'	'0.0966'
$a_{\mu}$	'3.9241'	'8.4088'	'6.8763'	'5.6058'	'0.0696'
$b_{\mu}$	'2.5934'	'5.5574'	'8.4418'	'3.7049'	'0.0531'
$\mu$	'0.2857'	'0.6123'	'0.5172'	'0.4082'	'0.056'
$a_H$	'4.5371'	'9.7223'	'8.3832'	'6.4815'	'0.0685'
$b_H$	'5.4268'	'11.6288'	'7.7622'	'7.7525'	'0.0657'
$\nu$	'89.0979'	'190.924'	'150.8676'	'127.2827'	'0.0755'
BP	'345'	'388'	'366.5'	'354.5'	'0.1353'

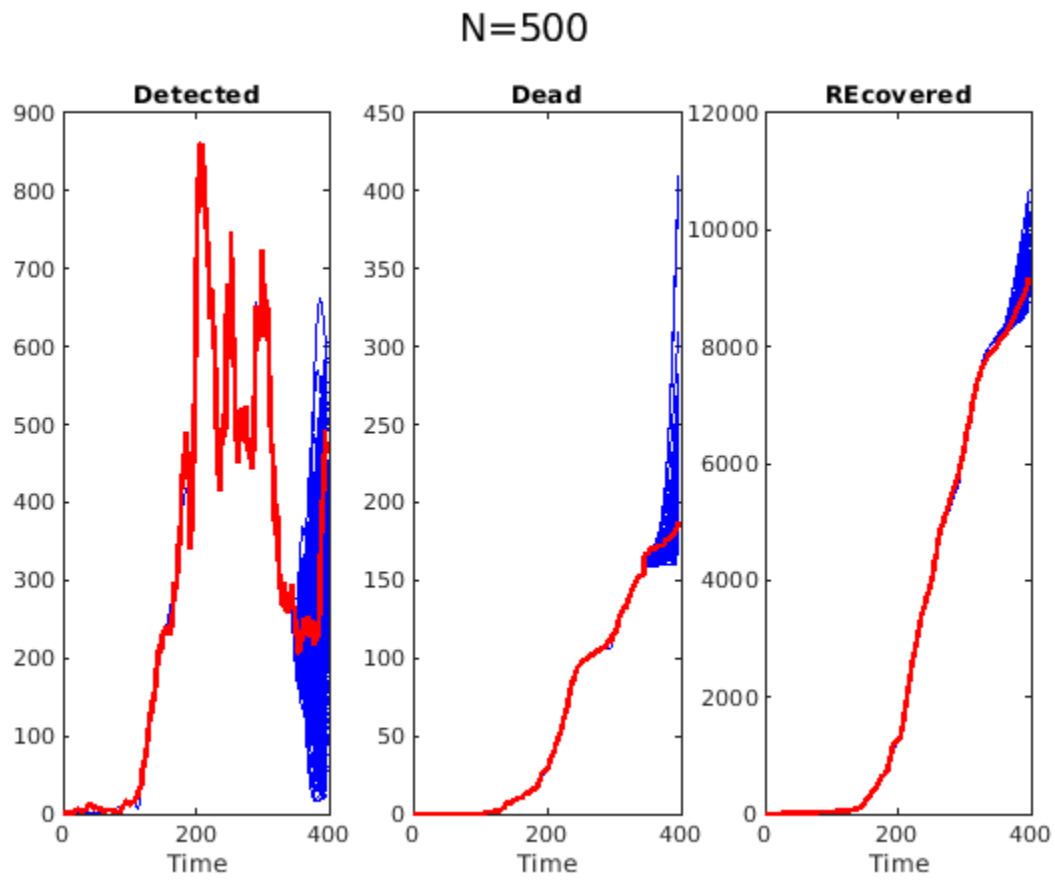
### 10.3. Identifiability analysis







## 10.4. Uncertainty analysis



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## Chapter 11. Extension number11

### 11.1. Basic information

The extension to be validated consists of the time series from the data398 to the 428. The status of the validation is: COMPLETED.

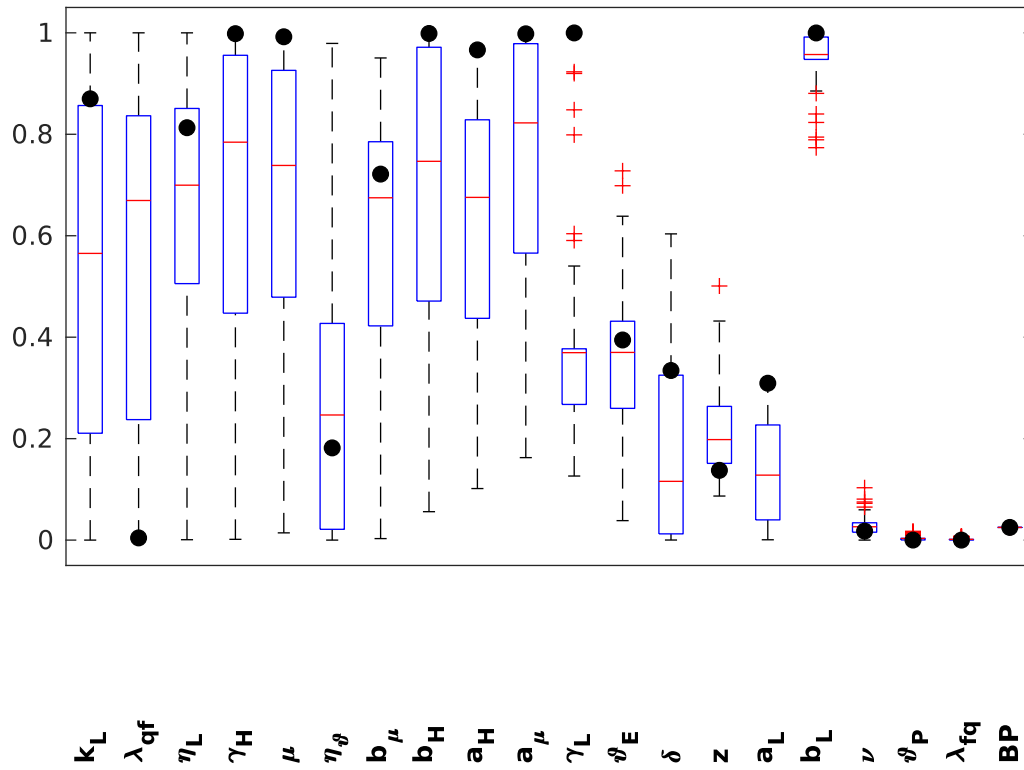
The number of estimations needed to perform the validation was4000.

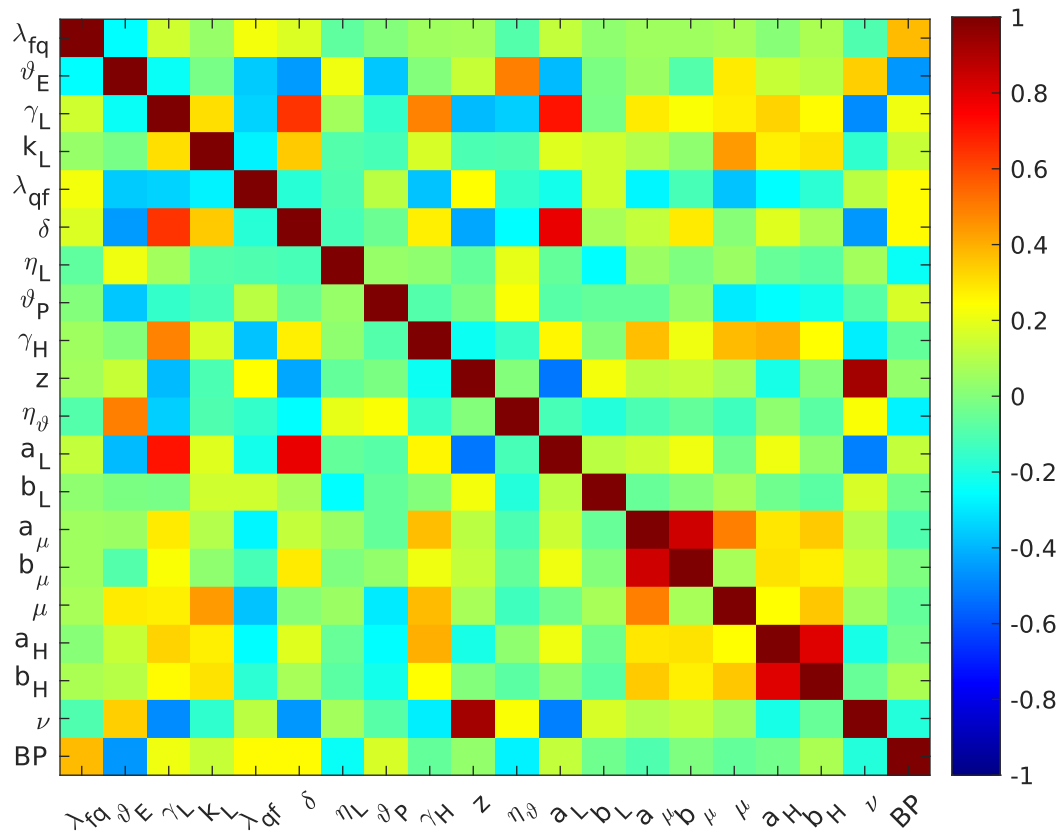
### 11.2. Estimated parameters with their intervals

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

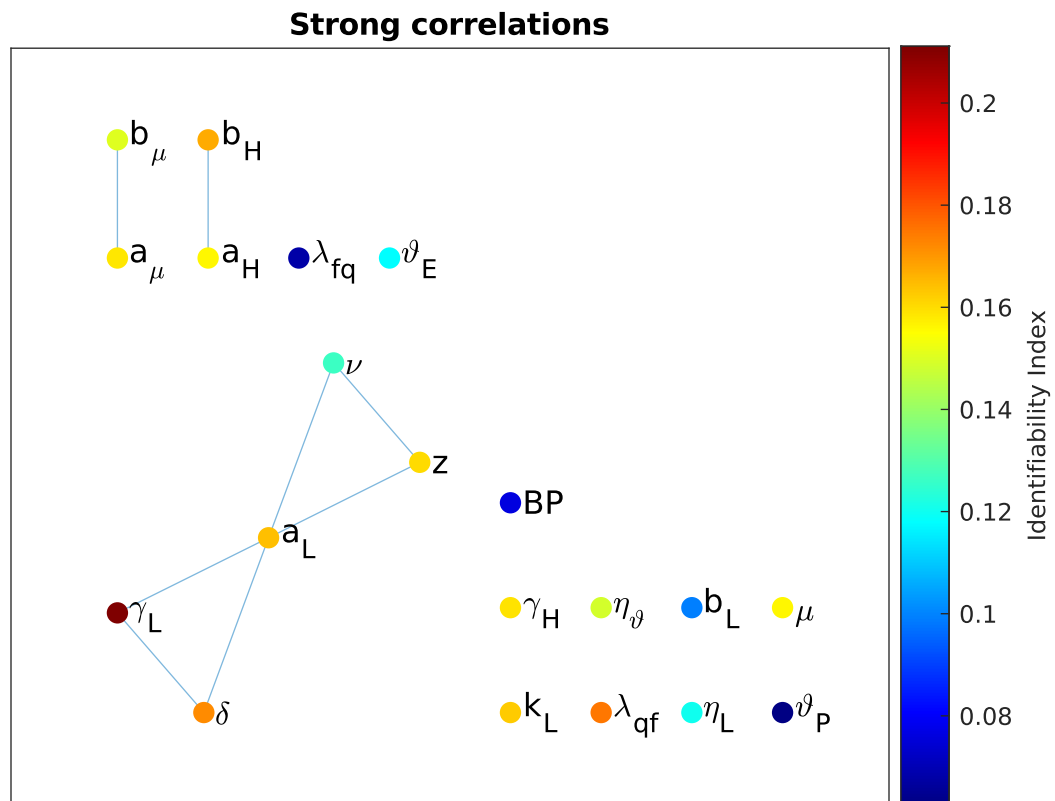
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0355'	'0.0015'	'0'	'0.0684'
\vartheta_E	'0.3317'	'0.4082'	'0.37'	'0.3945'	'0.1181'
\gamma_L	'0.2831'	'0.4568'	'0.37'	'0.9998'	'0.2111'
k_L	'5.2223'	'6.9508'	'6.0865'	'8.8291'	'0.163'
\lambda_{qf}	'0.5728'	'0.7662'	'0.6695'	'0.0043'	'0.1749'
\delta	'0.0093'	'0.0266'	'0.018'	'0.0502'	'0.172'
\eta_L	'0.6269'	'0.7724'	'0.6997'	'0.813'	'0.1207'
\vartheta_P	'0'	'0.0153'	'0.0033'	'0.0001'	'0.0627'
\gamma_H	'0.7016'	'0.8673'	'0.7844'	'0.9983'	'0.159'
z	'4.1069'	'7.8057'	'5.9563'	'4.1252'	'0.1604'
\eta_{\vartheta}	'0.1631'	'0.3302'	'0.2466'	'0.1818'	'0.149'
a_L	'2.3845'	'3.2014'	'2.7929'	'5.3294'	'0.1643'
b_L	'13.5096'	'15'	'14.3956'	'14.9962'	'0.0996'
a_{\mu}	'11.5075'	'13.5212'	'12.5143'	'14.9729'	'0.1588'
b_{\mu}	'9.4073'	'11.4876'	'10.4475'	'11.101'	'0.1506'
\mu	'0.6547'	'0.8224'	'0.7386'	'0.9922'	'0.1561'
a_H	'9.5445'	'11.3721'	'10.4583'	'14.5289'	'0.1561'
b_H	'10.2644'	'12.6435'	'11.4539'	'14.9821'	'0.1676'
\nu	'3.7329'	'22.7875'	'13.2602'	'8.8691'	'0.127'
BP	'398.2465'	'398.7535'	'398.5'	'398.5'	'0.0763'

### 11.3. Identifiability analysis

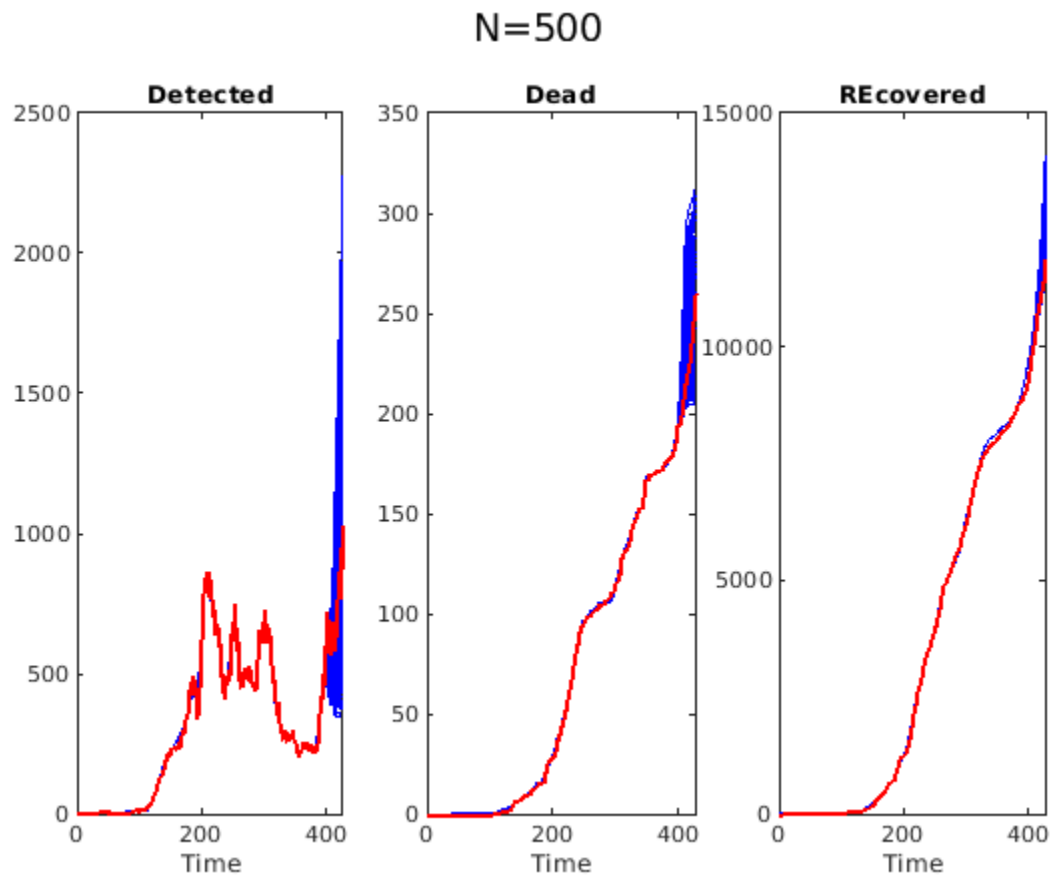








## 11.4. Uncertainty analysys



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## Chapter 12. Extension number12

### 12.1. Basic information

The extension to be validated consists of the time series from the data428 to the 461. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

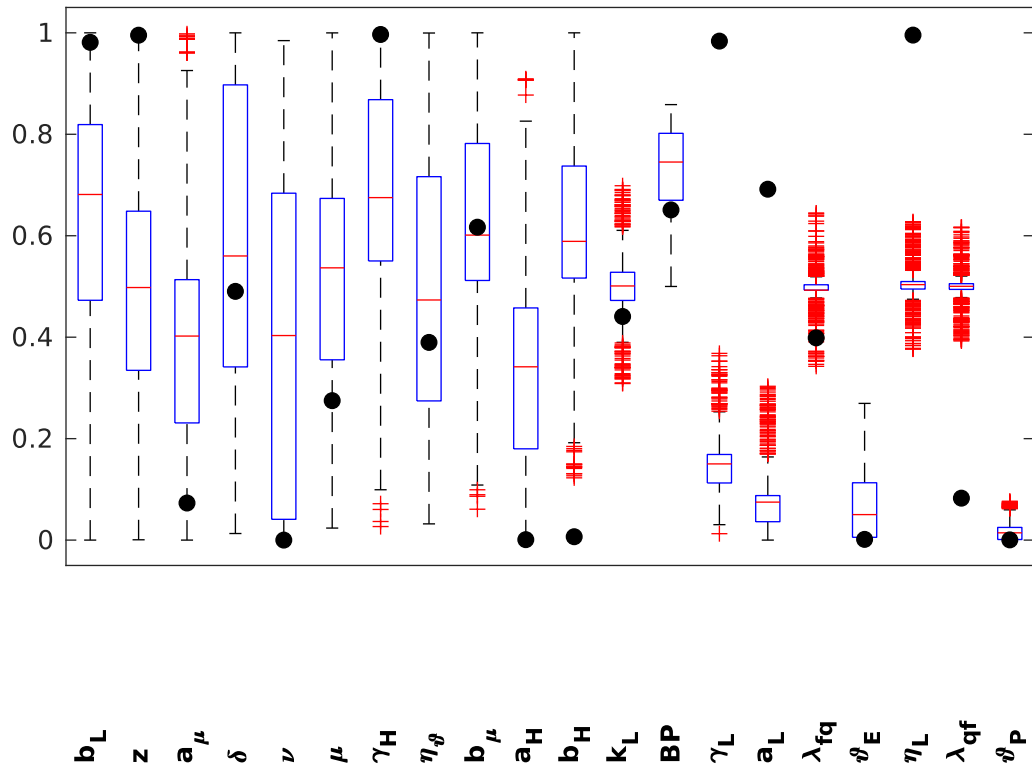
### 12.2. Estimated parameters with their intervals

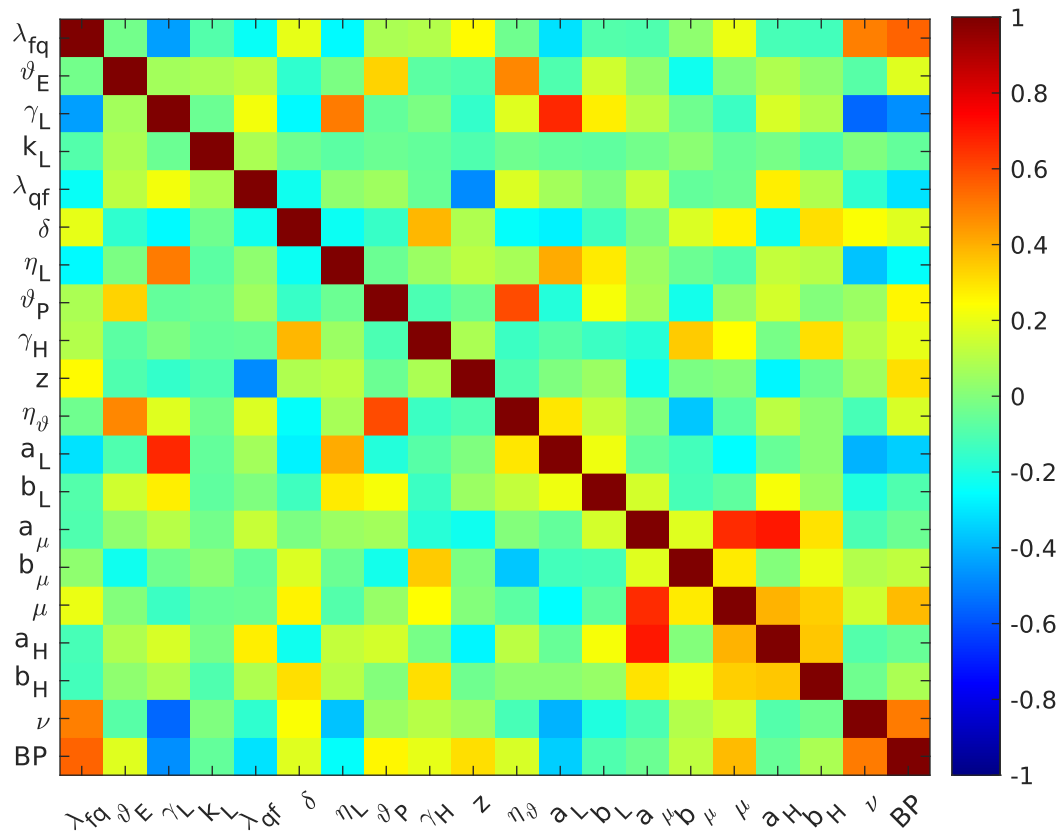
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

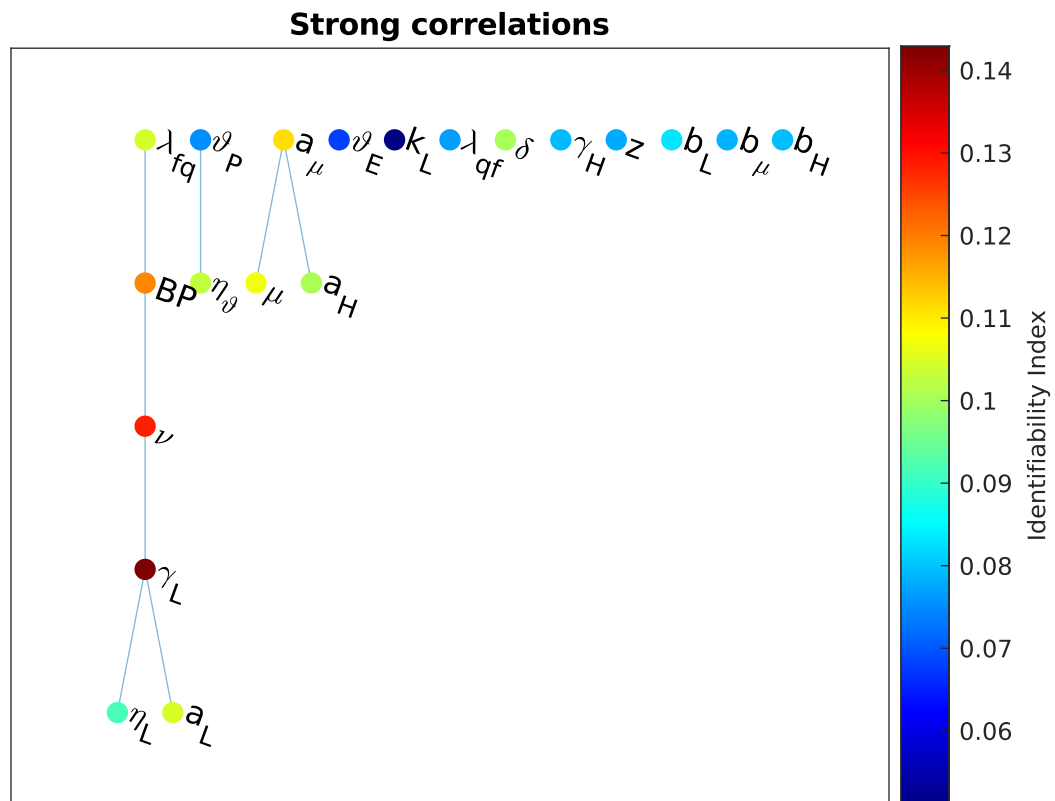
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3363'	'0.4964'	'0.4927'	'0.3986'	'0.1042'
$\vartheta_E$	'0'	'0.0032'	'0.0503'	'0.0014'	'0.068'
$\gamma_L$	'0.6614'	'0.9865'	'0.1502'	'0.9837'	'0.1429'
$k_L$	'1.225'	'10'	'5.5089'	'4.9673'	'0.0511'
$\lambda_{qf}$	'0.058'	'0.1175'	'0.5003'	'0.0827'	'0.0769'
$\delta$	'0'	'0.1073'	'0.084'	'0.0736'	'0.1005'
$\eta_L$	'0.5842'	'1'	'0.5036'	'0.9955'	'0.0919'
$\vartheta_P$	'0.0004'	'0.001'	'0.0143'	'0.0004'	'0.0752'
$\gamma_H$	'0.4209'	'1'	'0.6752'	'0.9968'	'0.0793'
$z$	'21.5611'	'30'	'14.9369'	'29.8604'	'0.0777'
$\eta_{\vartheta}$	'0.3859'	'0.4281'	'0.4734'	'0.3897'	'0.1029'
$a_L$	'9.7528'	'11.7321'	'2.0482'	'10.6842'	'0.1047'
$b_L$	'11.7093'	'15'	'10.5387'	'14.7375'	'0.0831'
$a_{\mu}$	'1.5218'	'12.7269'	'6.6311'	'2.0231'	'0.1111'
$b_{\mu}$	'2.0325'	'15'	'9.4176'	'9.6358'	'0.0785'
$\mu$	'0.042'	'0.569'	'0.5367'	'0.2749'	'0.1071'
$a_H$	'1'	'1.431'	'5.7827'	'1.0121'	'0.1008'
$b_H$	'1'	'8.0682'	'9.2447'	'1.0932'	'0.0795'
$\nu$	'0'	'0.017'	'201.6204'	'0.0076'	'0.1282'
BP	'432.2407'	'435.4032'	'437.5'	'432.4999'	'0.1192'

### 12.3. Identifiability analysys

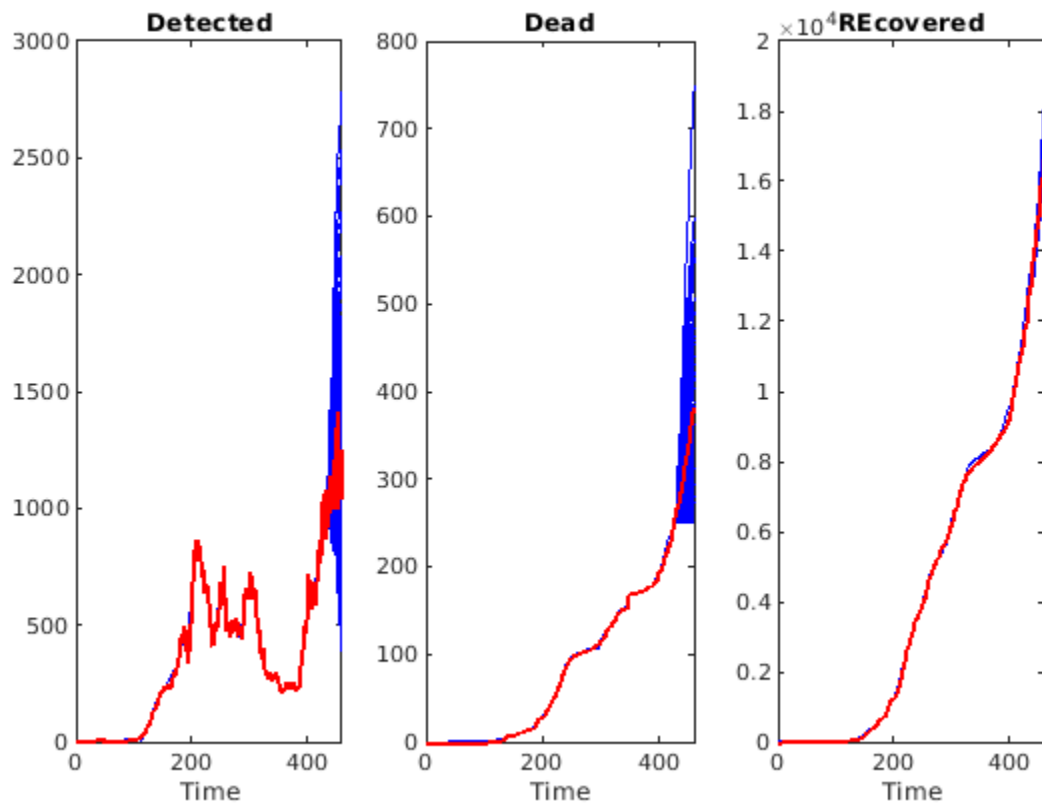






## 12.4. Uncertainty analysis

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 data461 to the 470. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

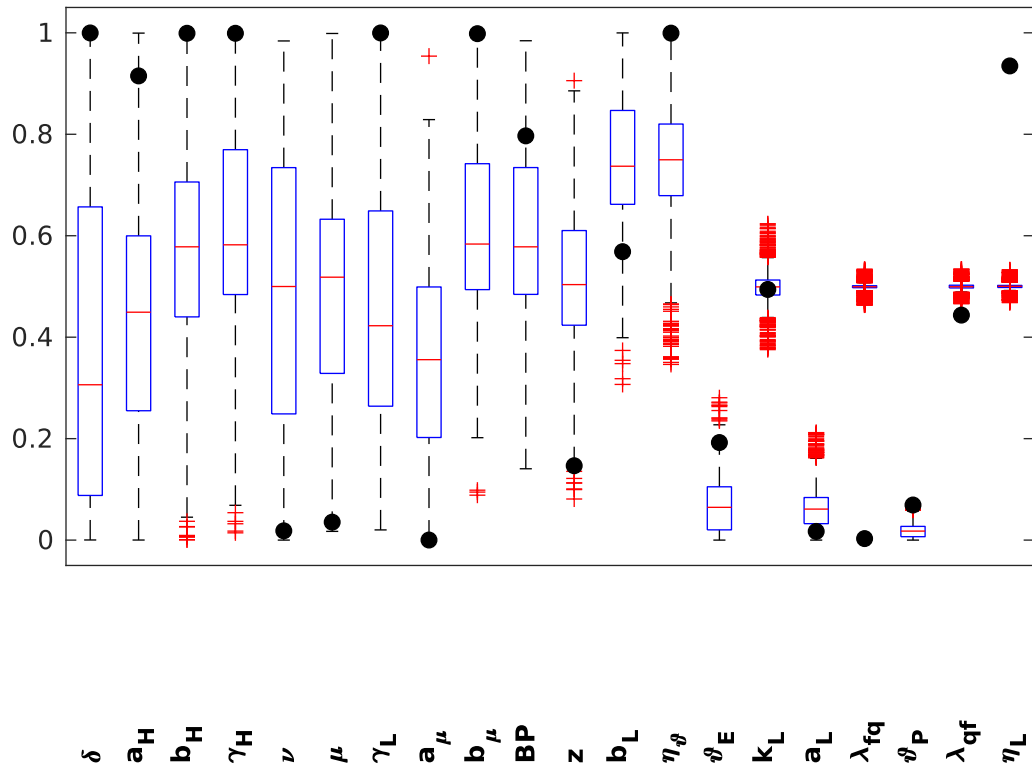
### 13.2. Estimated parameters with their intervals

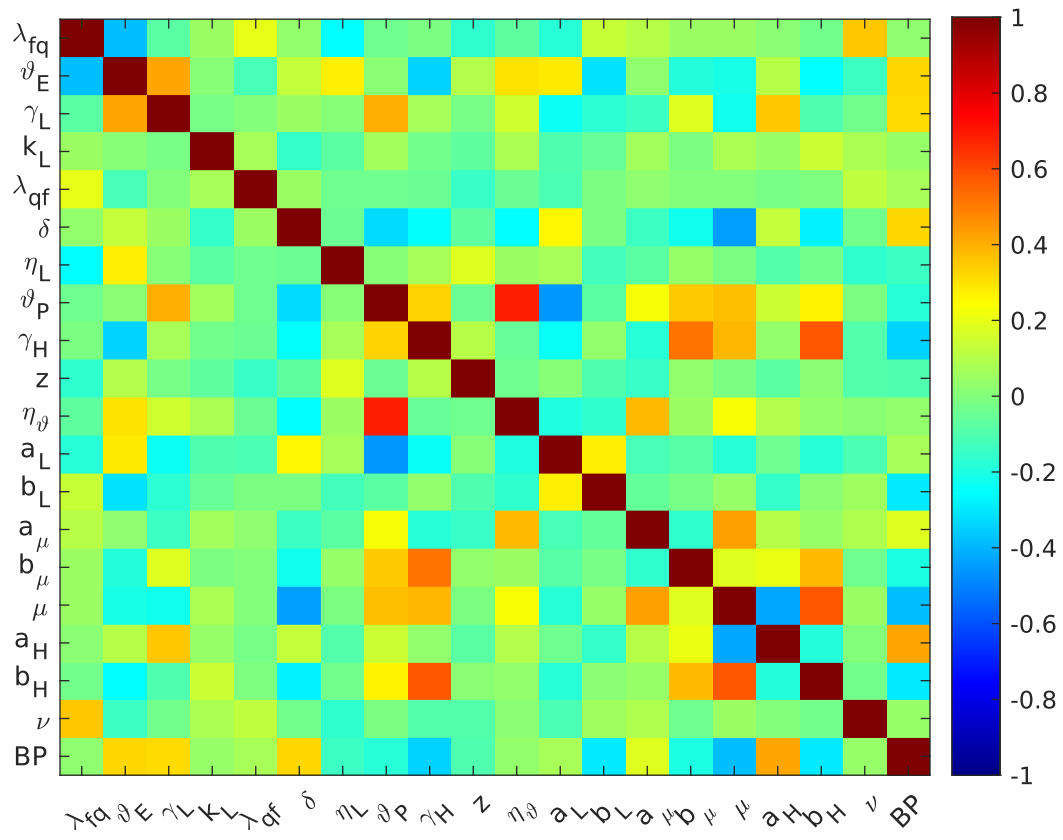
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

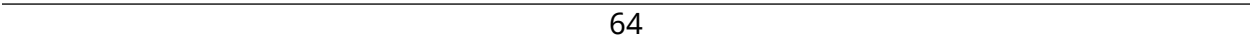
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4871'	'0.5117'	'0.4994'	'0.003'	'0.0649'
\vartheta_E	'0.0554'	'0.0738'	'0.0646'	'0.1923'	'0.0831'
\gamma_L	'0.3987'	'0.4464'	'0.4226'	'0.9997'	'0.0857'
k_L	'5.4124'	'5.5728'	'5.4926'	'5.447'	'0.0493'
\lambda_{qf}	'0.4926'	'0.5063'	'0.4995'	'0.4435'	'0.0458'
\delta	'0.0412'	'0.0506'	'0.0459'	'0.15'	'0.0962'
\eta_L	'0.4926'	'0.5081'	'0.5004'	'0.9347'	'0.0547'
\vartheta_P	'0.0156'	'0.0199'	'0.0177'	'0.0692'	'0.0899'
\gamma_H	'0.5601'	'0.6041'	'0.5821'	'0.9991'	'0.1183'
z	'14.6089'	'15.6112'	'15.1101'	'4.398'	'0.0604'
\eta_{\vartheta}	'0.7312'	'0.7682'	'0.7497'	'0.9994'	'0.0924'
a_L	'1.7052'	'2.0062'	'1.8557'	'1.24'	'0.0754'
b_L	'11.087'	'11.5496'	'11.3183'	'8.9601'	'0.0677'
a_{\mu}	'5.7299'	'6.2295'	'5.9797'	'1.0019'	'0.0764'
b_{\mu}	'8.8834'	'9.4576'	'9.1705'	'14.9765'	'0.0944'
\mu	'0.4914'	'0.5452'	'0.5183'	'0.0354'	'0.118'
a_H	'6.9754'	'7.6038'	'7.2896'	'13.811'	'0.0805'
b_H	'8.7886'	'9.3998'	'9.0942'	'14.9874'	'0.1146'
\nu	'236.1168'	'263.7868'	'249.9518'	'9.1296'	'0.0719'
BP	'446.0285'	'446.9715'	'446.5'	'453.5'	'0.087'



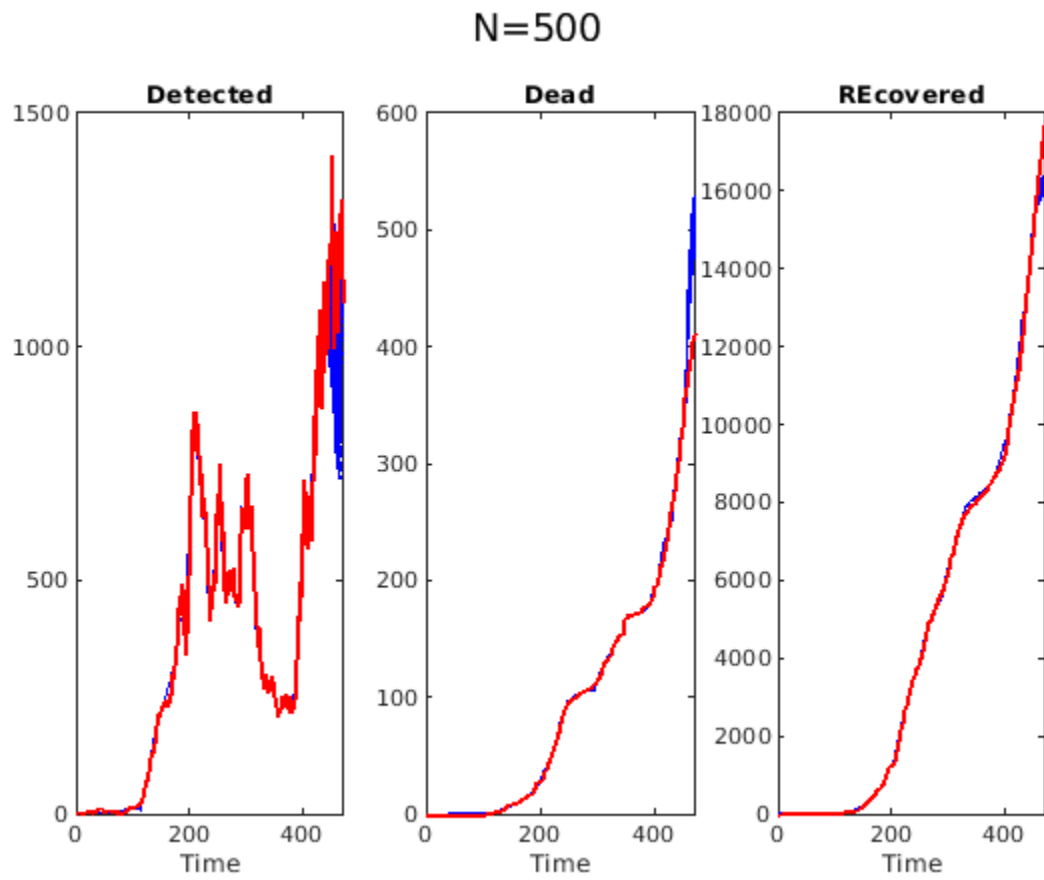
### 13.3. Identifiability analysis







### 13.4. Uncertainty analysys



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## Chapter 14. Extension number14

### 14.1. Basic information

The extension to be validated consists of the time series from the data470 to the 728. The status of the validation is: COMPLETED.

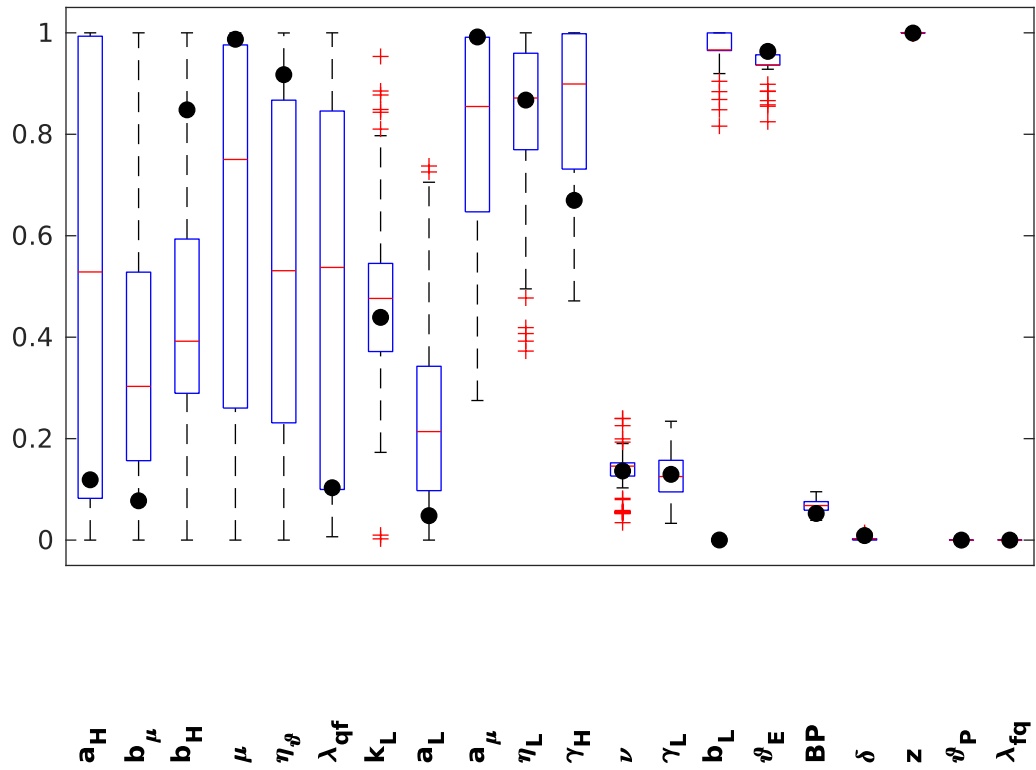
The number of estimations needed to perform the validation was1000.

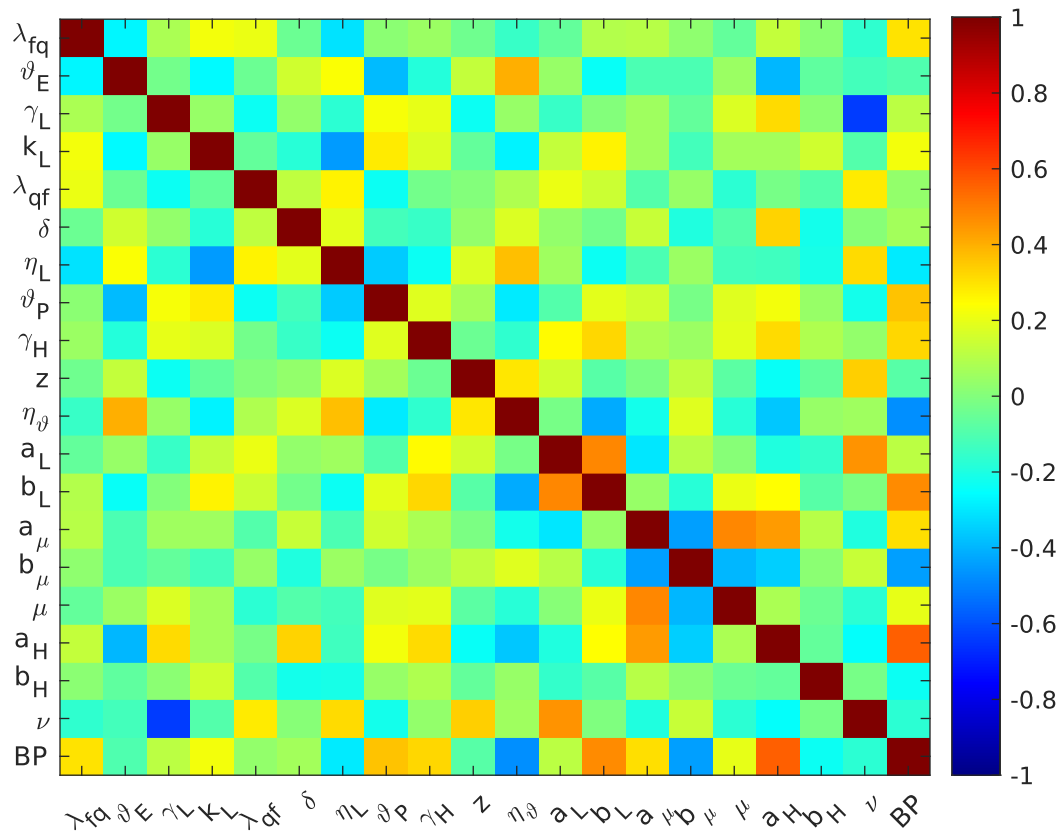
### 14.2. Estimated parameters with their intervals

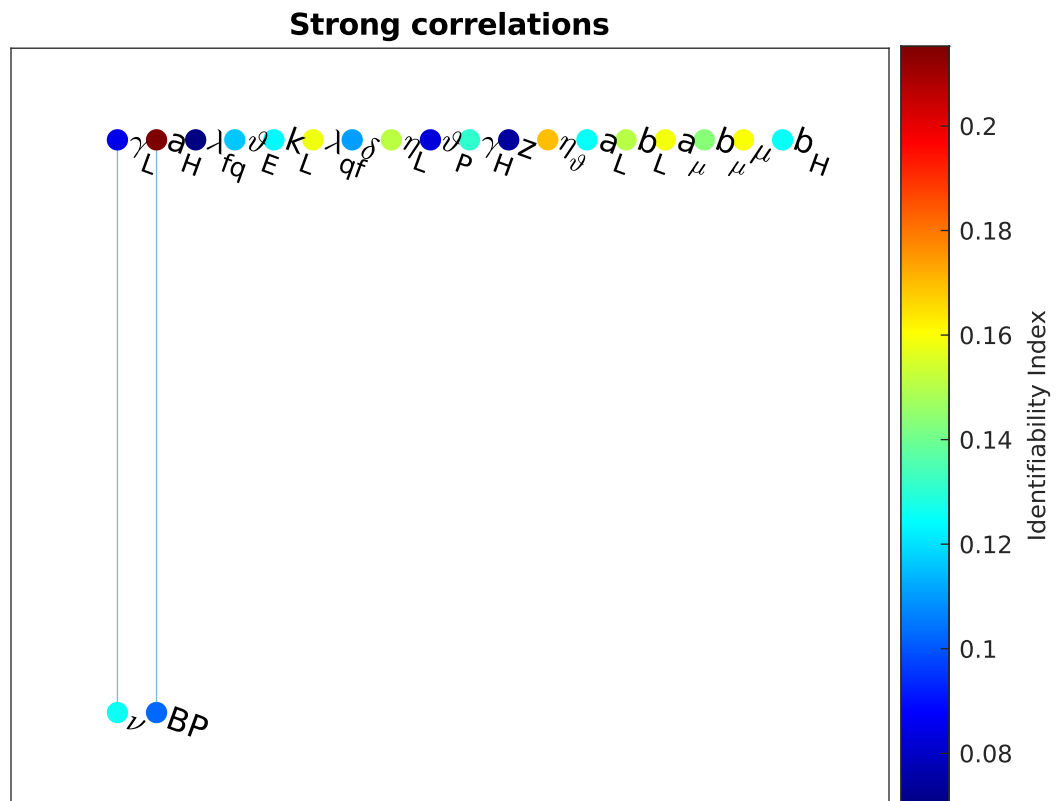
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0323'	'0'	'0'	'0.0703'
\vartheta_E	'0.8866'	'0.9862'	'0.9364'	'0.9634'	'0.1163'
\gamma_L	'0.1125'	'0.1381'	'0.1253'	'0.1296'	'0.0855'
k_L	'4.7597'	'5.819'	'5.2894'	'4.9518'	'0.1237'
\lambda_{qf}	'0.4338'	'0.6412'	'0.5375'	'0.1032'	'0.1584'
\delta	'0'	'0.0172'	'0.0004'	'0.0013'	'0.1109'
\eta_L	'0.7982'	'0.9438'	'0.871'	'0.8674'	'0.1512'
\vartheta_P	'0'	'0.0248'	'0'	'0'	'0.0829'
\gamma_H	'0.831'	'0.9665'	'0.8988'	'0.6698'	'0.131'
z	'28.7026'	'30'	'29.9921'	'29.9856'	'0.0744'
\eta_{\vartheta}	'0.4387'	'0.6235'	'0.5311'	'0.9175'	'0.1698'
a_L	'3.1248'	'4.893'	'4.0089'	'1.6745'	'0.1258'
b_L	'12.7952'	'15'	'14.5105'	'1.0025'	'0.1505'
a_{\mu}	'11.6652'	'14.2162'	'12.9407'	'14.8859'	'0.159'
b_{\mu}	'4.1128'	'6.3721'	'5.2425'	'2.0852'	'0.1436'
\mu	'0.6523'	'0.8484'	'0.7504'	'0.9873'	'0.16'
a_H	'6.7349'	'10.0662'	'8.4005'	'2.6642'	'0.2153'
b_H	'5.3809'	'7.597'	'6.4889'	'12.8747'	'0.1258'
\nu	'51.4263'	'94.4132'	'72.9197'	'68.1369'	'0.1262'
BP	'477.3683'	'479.6316'	'478.4999'	'474.5'	'0.1026'

### 14.3. Identifiability analysis









## 14.4. Uncertainty analysis

