

# **Validation process for VILLAVICENCIO**

**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 50. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

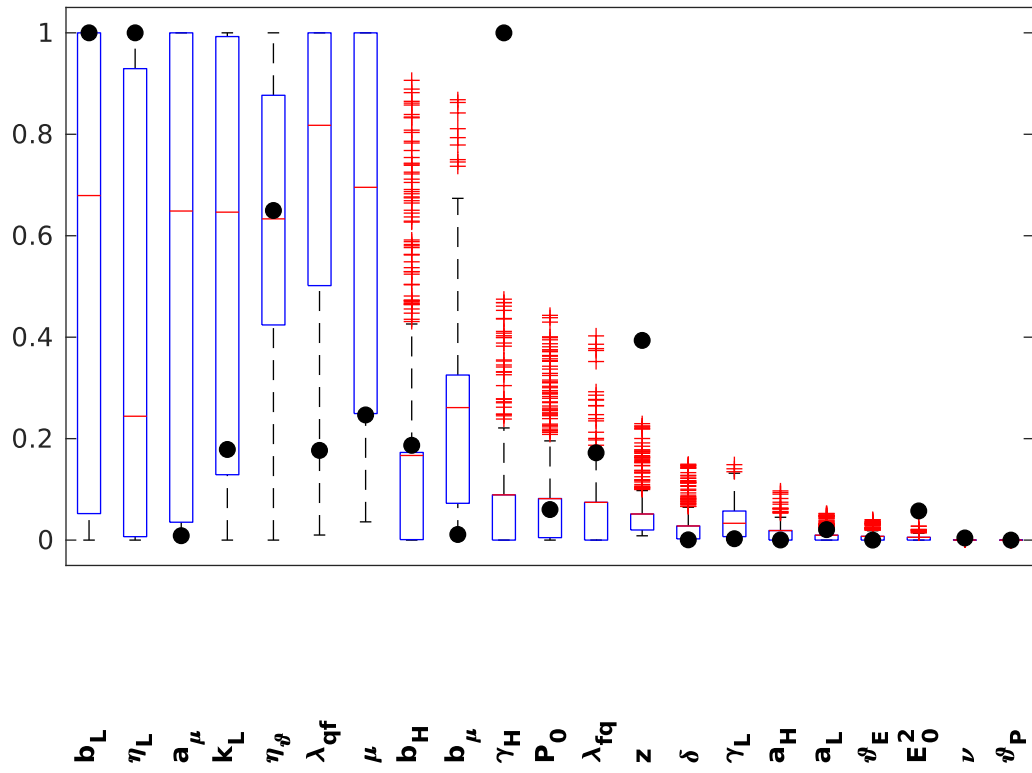
### 1.2. Estimated parameters with their intervals

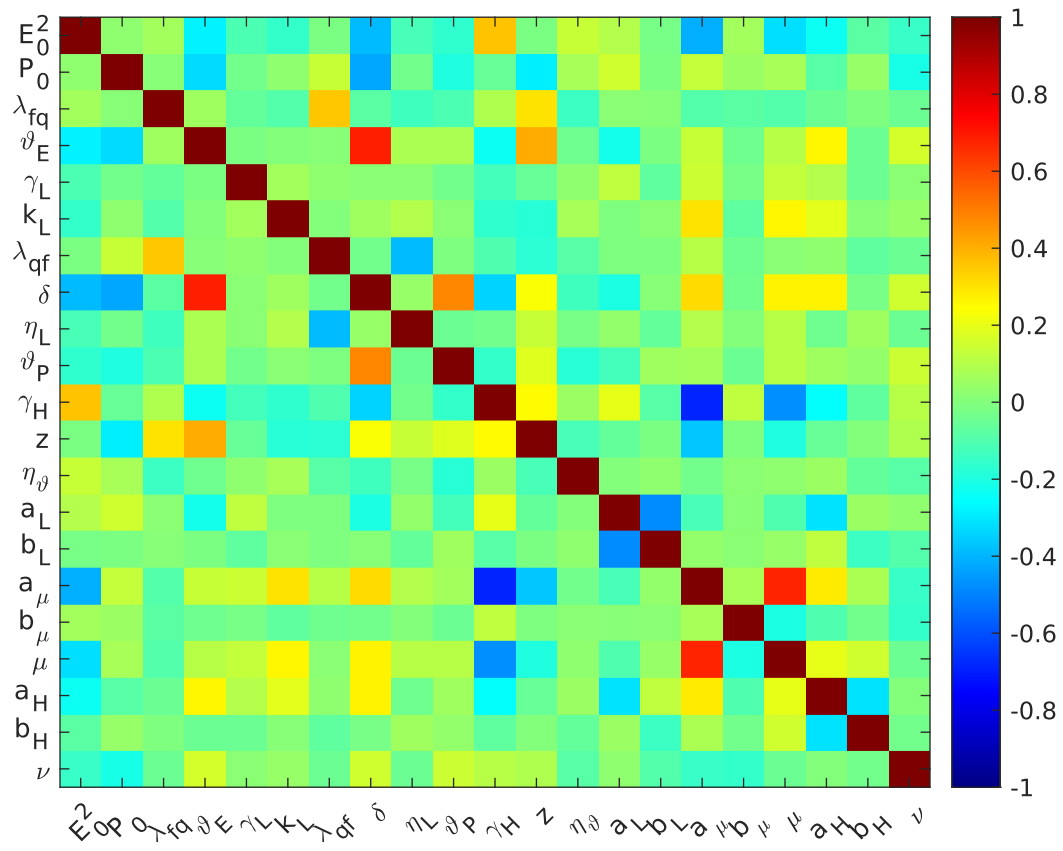
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

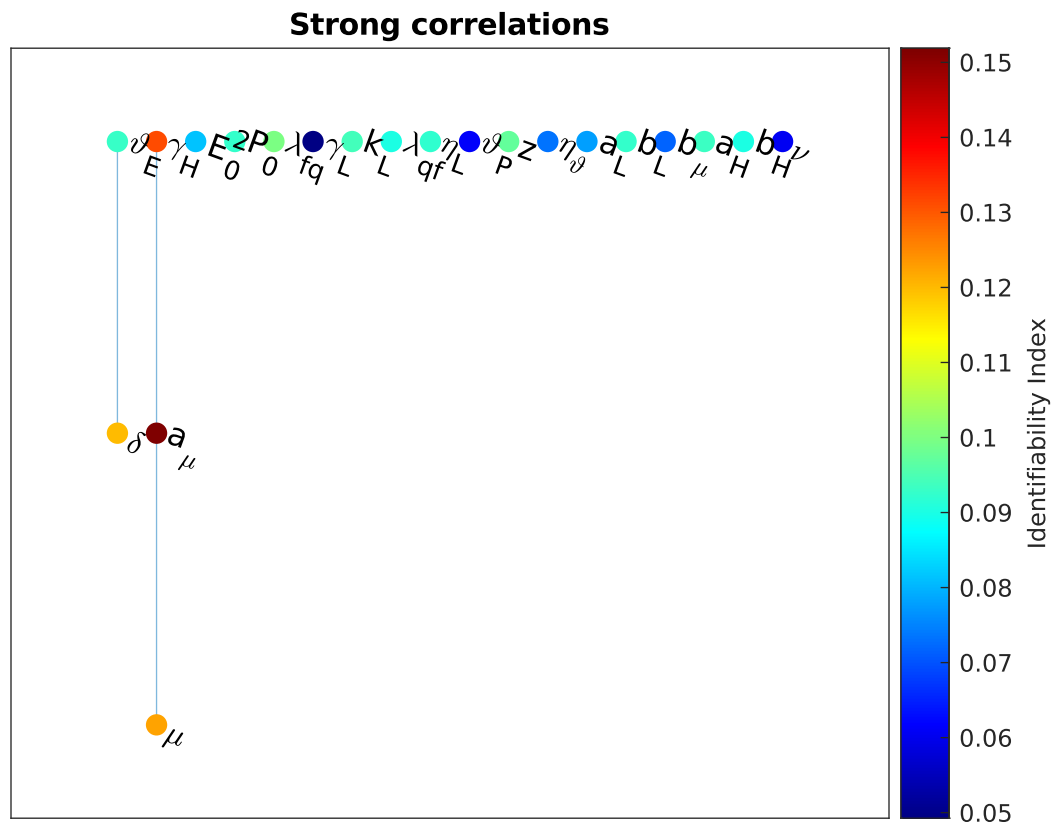
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
E^2_0	'23.9601'	'190.245'	'10.9675'	'115.0398'	'0.0814'
P_0	'13.1934'	'50.0304'	'32.6888'	'24.0963'	'0.0927'
\lambda_{fq}	'0.1598'	'0.1909'	'0.0744'	'0.1721'	'0.0998'
\vartheta_E	'0'	'0'	'0.0074'	'0'	'0.093'
\gamma_L	'0.0007'	'0.0061'	'0.0332'	'0.0027'	'0.0493'
k_L	'1.2138'	'9.55'	'6.8184'	'2.6079'	'0.0943'
\lambda_{qf}	'0.1691'	'0.211'	'0.8177'	'0.1769'	'0.0904'
\delta	'0.0001'	'0.0001'	'0.0042'	'0.0001'	'0.1198'
\eta_L	'0.7036'	'1'	'0.2442'	'1'	'0.0925'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0616'
\gamma_H	'0.8831'	'1'	'0.0892'	'0.9999'	'0.1312'
z	'11.2322'	'14.0957'	'1.544'	'11.8096'	'0.0975'
\eta_{\vartheta}	'0.6482'	'0.6626'	'0.6333'	'0.6497'	'0.0734'
a_L	'1'	'14.3'	'1.1357'	'1.2894'	'0.0779'
b_L	'4.4963'	'15'	'10.509'	'15'	'0.0926'
a_{\mu}	'1'	'1.2452'	'10.0819'	'1.1216'	'0.1519'
b_{\mu}	'1'	'12.34'	'4.6569'	'1.1552'	'0.0721'
\mu	'0.2307'	'0.2486'	'0.6955'	'0.2467'	'0.1223'
a_H	'1'	'1.2951'	'1.2634'	'1.0032'	'0.0936'
b_H	'3.3667'	'11.844'	'3.3356'	'3.6163'	'0.0903'
\nu	'2.0095'	'3.661'	'0.0771'	'2.0986'	'0.0608'

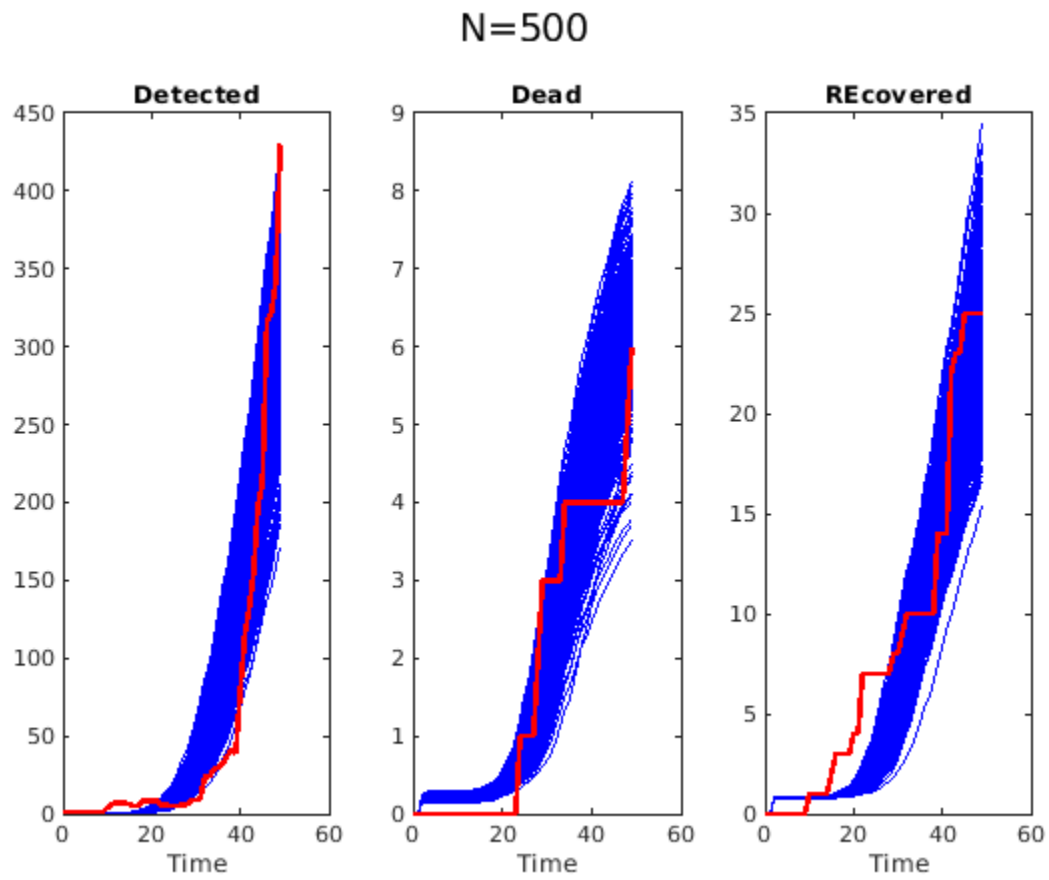
### 1.3. Identifiability analysis







## 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 data50 to the 80. The status of the validation is: COMPLETED.

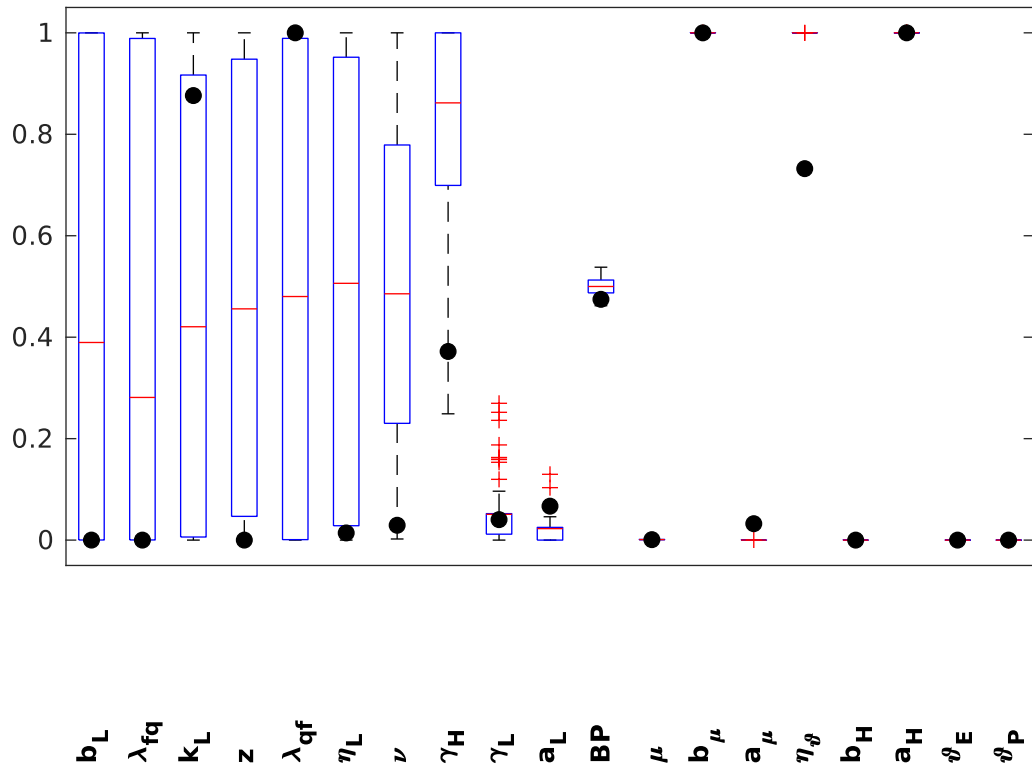
The number of estimations needed to perform the validation was8000.

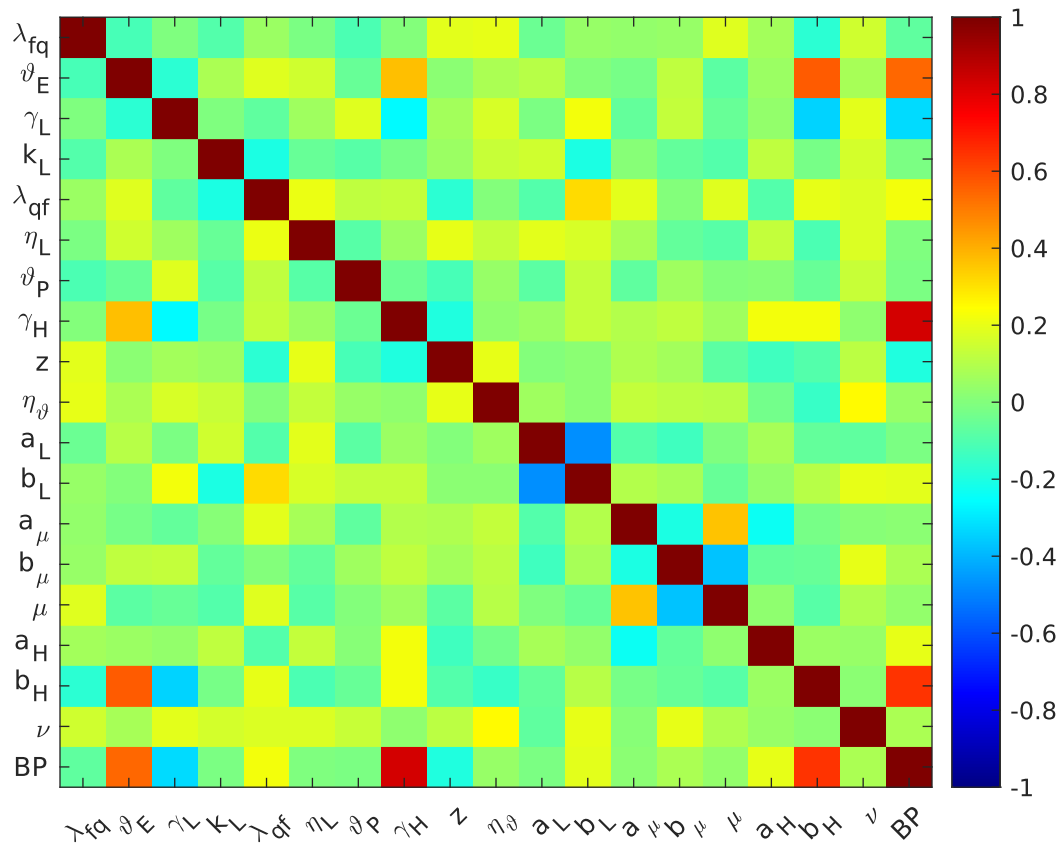
### 2.2. Estimated parameters with their intervals

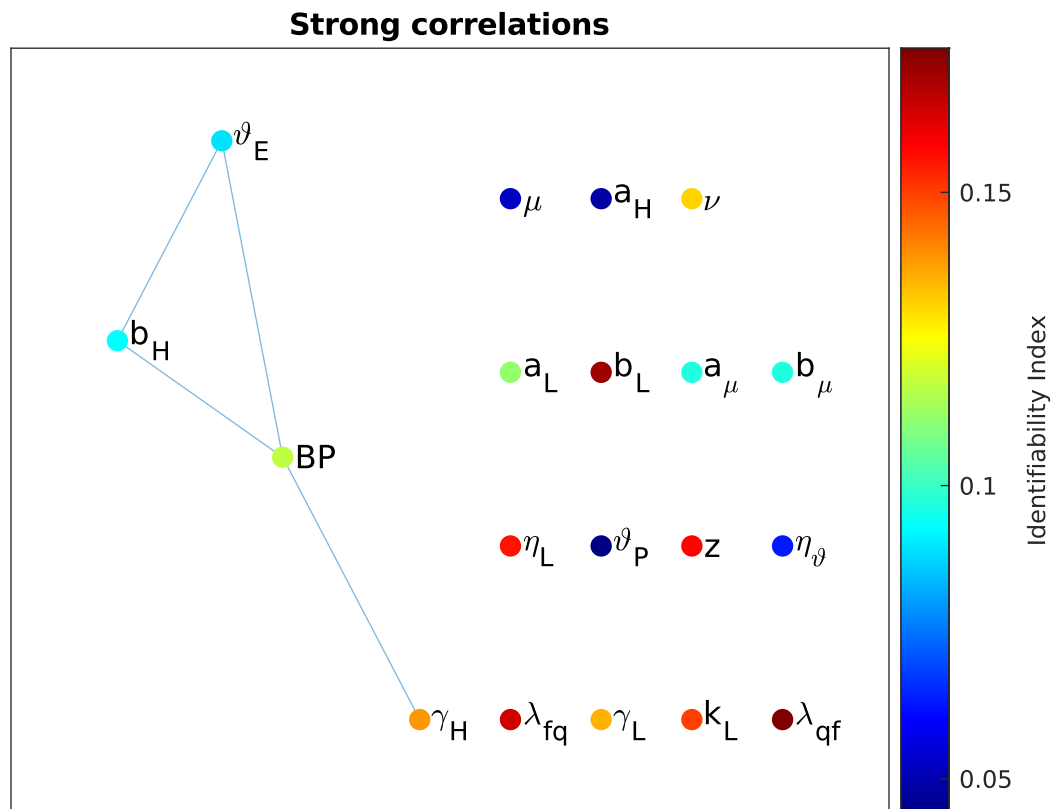
It was necessary to fix 1 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.1636'	'0.3988'	'0.2812'	'0'	'0.1644'
$\vartheta_E$	'0'	'0.0002'	'0'	'0'	'0.0894'
$\gamma_L$	'0'	'0.1568'	'0.0522'	'0.0403'	'0.1353'
$k_L$	'3.8537'	'5.7167'	'4.7852'	'8.887'	'0.1499'
$\lambda_{qf}$	'0.3661'	'0.5942'	'0.4802'	'1'	'0.1746'
$\delta$	'0.0073'	'0.0073'	'0.0073'	'0.0073'	'0'
$\eta_L$	'0.4022'	'0.6102'	'0.5062'	'0.0141'	'0.1557'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0443'
$\gamma_H$	'0.8004'	'0.9234'	'0.8619'	'0.3719'	'0.1386'
$z$	'10.5207'	'16.8305'	'13.6756'	'0.0004'	'0.1575'
$\eta_{\vartheta}$	'0.9755'	'1'	'1'	'0.7323'	'0.0635'
$a_L$	'1'	'2.7646'	'1.351'	'1.9364'	'0.1118'
$b_L$	'4.8949'	'8.0129'	'6.4539'	'1.0005'	'0.1702'
$a_{\mu}$	'1'	'2.3086'	'1.0009'	'1.4528'	'0.0968'
$b_{\mu}$	'13.7333'	'15'	'14.9994'	'14.9992'	'0.0971'
$\mu$	'0'	'0.002'	'0.001'	'0.0009'	'0.0525'
$a_H$	'14.9659'	'15'	'15'	'15'	'0.0487'
$b_H$	'1'	'1.0416'	'1.0001'	'1'	'0.093'
$\nu$	'204.6806'	'280.8728'	'242.7767'	'14.6336'	'0.1312'
BP	'40.0742'	'40.9213'	'40.4977'	'38.4965'	'0.1175'

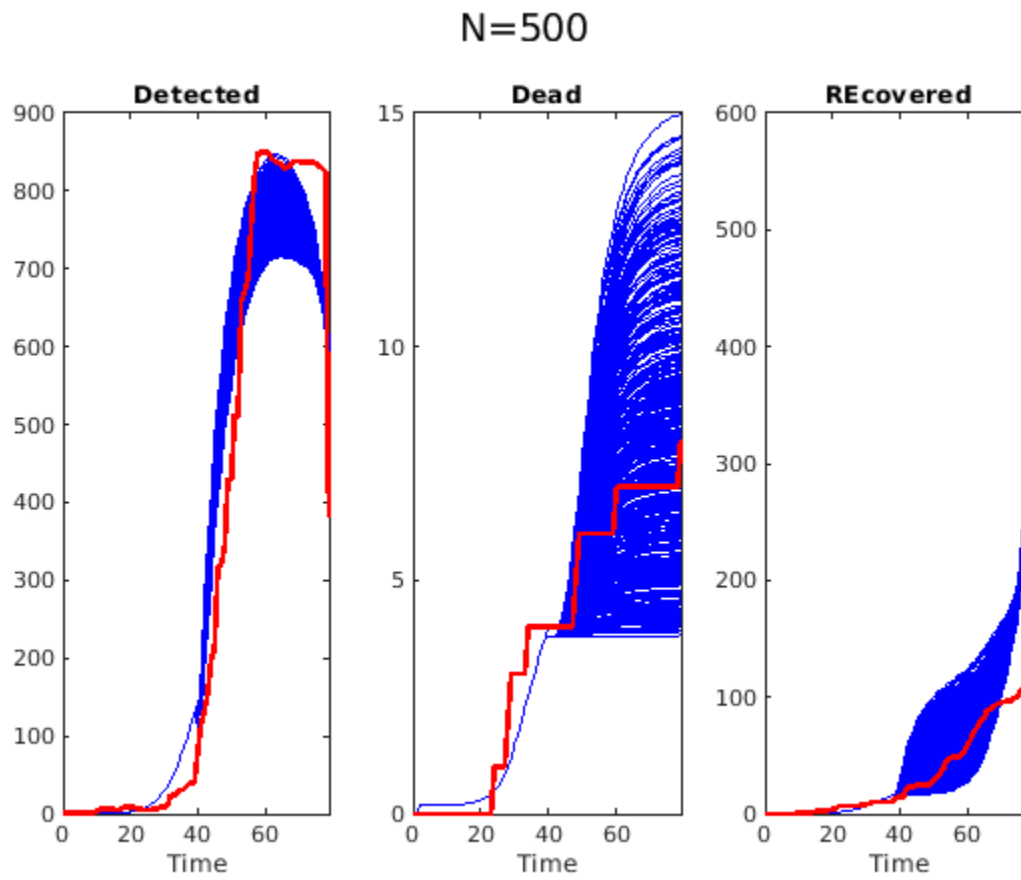
## 2.3. Identifiability analysys







## 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 data80 to the 118. The status of the validation is: COMPLETED.

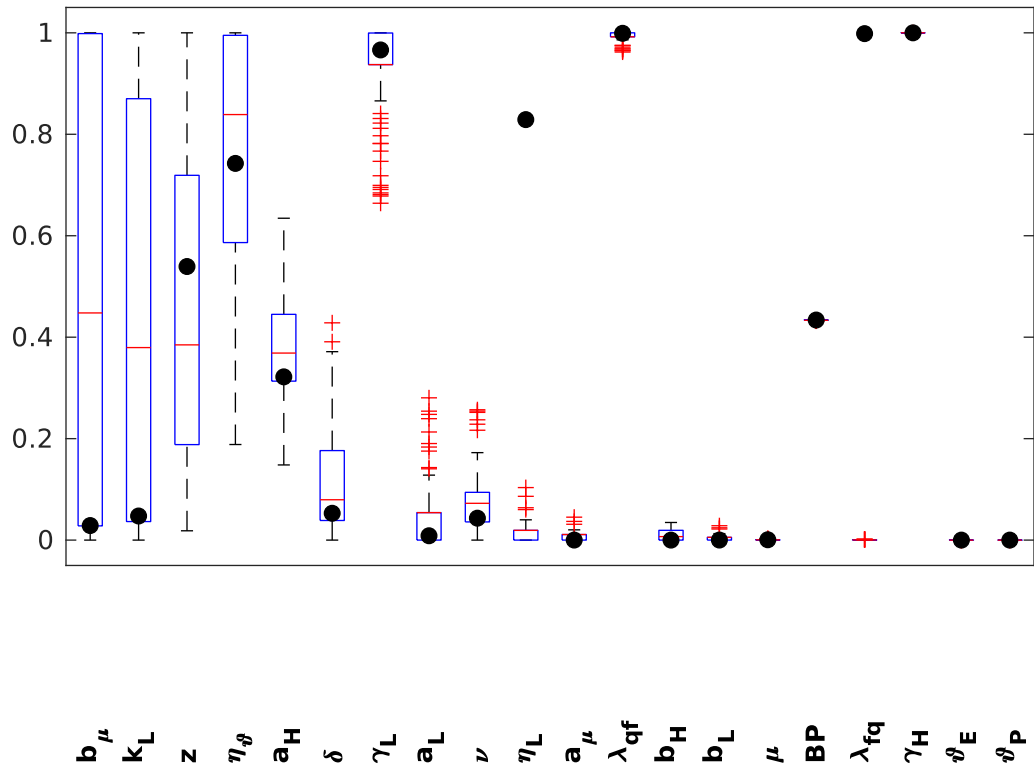
The number of estimations needed to perform the validation was2000.

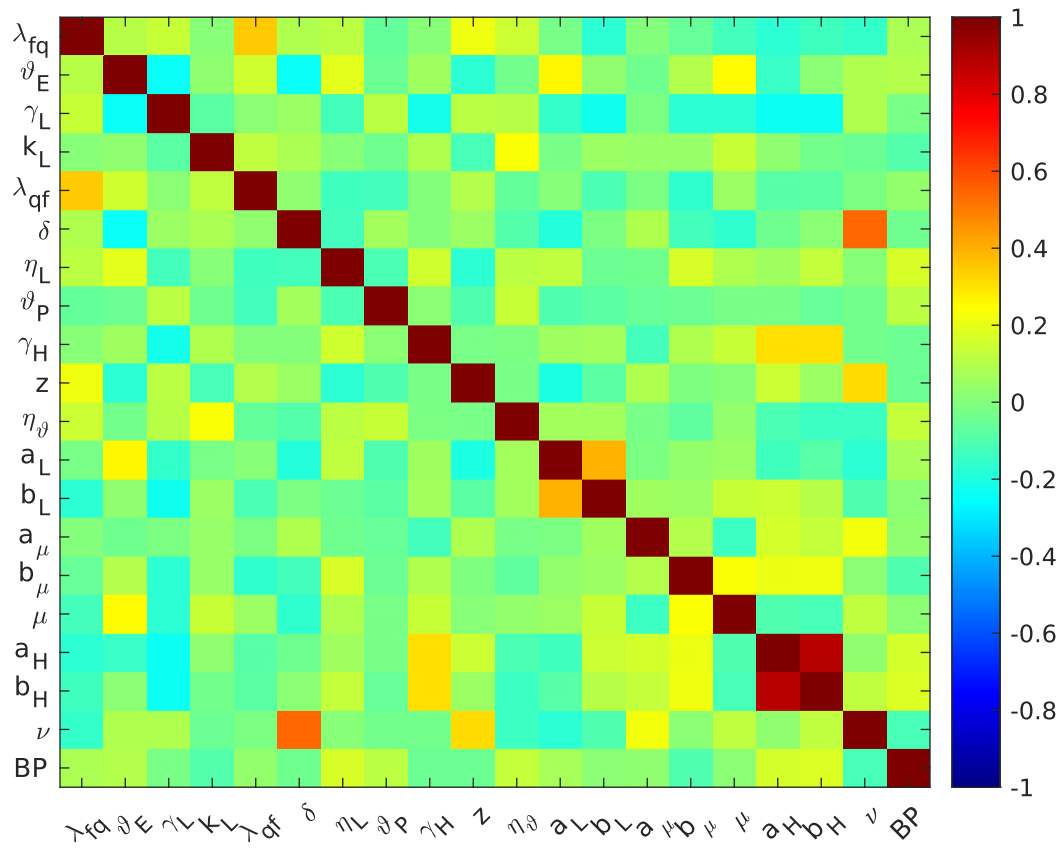
### 3.2. Estimated parameters with their intervals

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

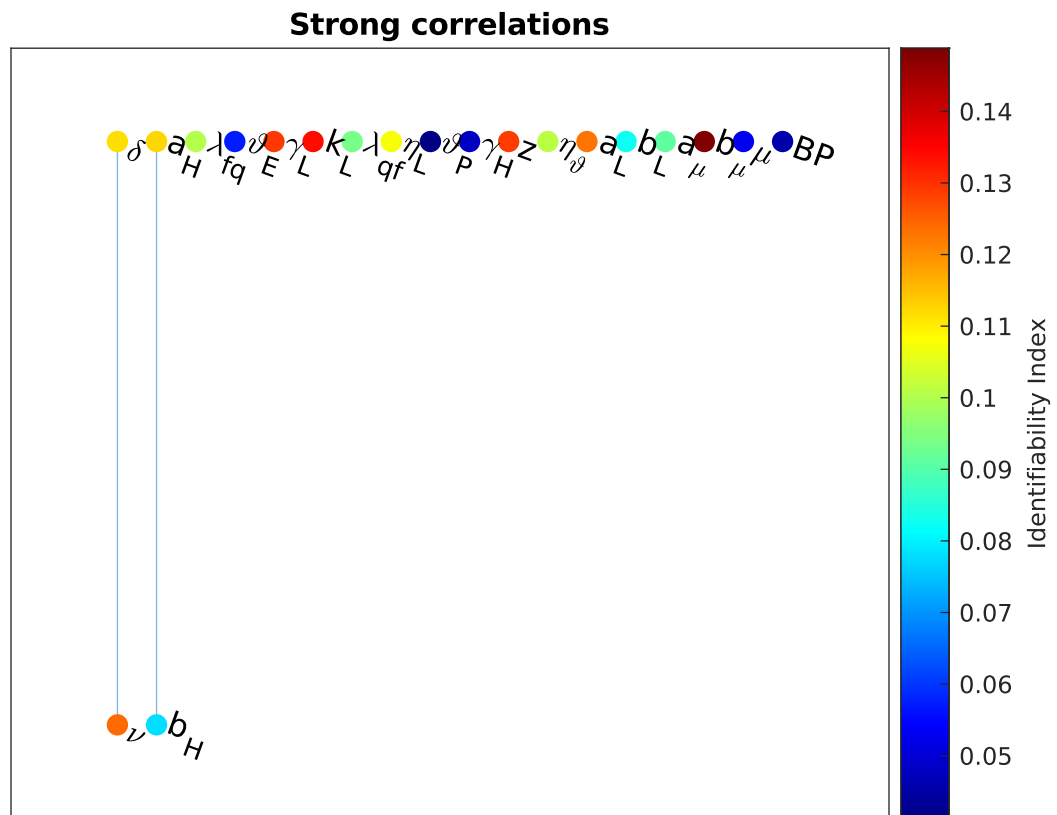
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0973'	'0.0003'	'0.9984'	'0.1005'
$\vartheta_E$	'0'	'0.0082'	'0'	'0'	'0.0576'
$\gamma_L$	'0.853'	'1'	'0.9373'	'0.9663'	'0.1292'
$k_L$	'3.5796'	'5.2517'	'4.4157'	'1.4275'	'0.1339'
$\lambda_{qf}$	'0.9022'	'1'	'0.9922'	'0.9991'	'0.0941'
$\delta$	'0.0046'	'0.0192'	'0.0119'	'0.0079'	'0.1116'
$\eta_L$	'0'	'0.1137'	'0.0192'	'0.8289'	'0.1073'
$\vartheta_P$	'0'	'0.0001'	'0'	'0'	'0.0413'
$\gamma_H$	'0.9967'	'1'	'1'	'1'	'0.0482'
$z$	'9.1756'	'13.916'	'11.5458'	'16.1793'	'0.1287'
$\eta_{\vartheta}$	'0.7841'	'0.8936'	'0.8389'	'0.7426'	'0.101'
$a_L$	'1'	'3.0023'	'1.7584'	'1.1199'	'0.1231'
$b_L$	'1'	'1.948'	'1.0759'	'1.0012'	'0.0828'
$a_{\mu}$	'1'	'2.3956'	'1.1538'	'1.0011'	'0.0916'
$b_{\mu}$	'5.8821'	'8.6567'	'7.2694'	'1.4015'	'0.1488'
$\mu$	'0'	'0.0029'	'0.0005'	'0.0007'	'0.0526'
$a_H$	'5.6598'	'6.6638'	'6.1618'	'5.5055'	'0.1125'
$b_H$	'1.057'	'1.1359'	'1.0964'	'1'	'0.0778'
$\nu$	'7.7533'	'64.7746'	'36.2639'	'21.6057'	'0.1237'
BP	'79.3681'	'79.5716'	'79.4699'	'79.5'	'0.0456'

### 3.3. Identifiability analysis

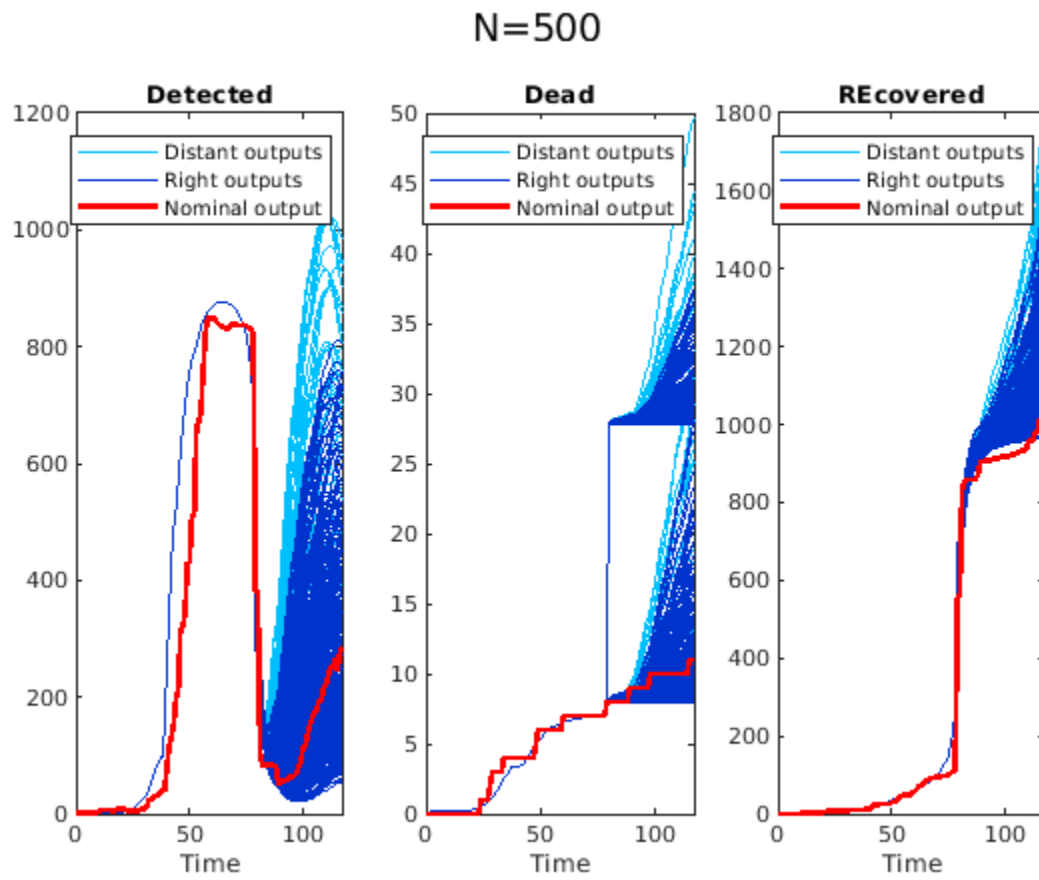








### 3.4. Uncertainty analysys



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## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data118 to the 148. The status of the validation is: COMPLETED.

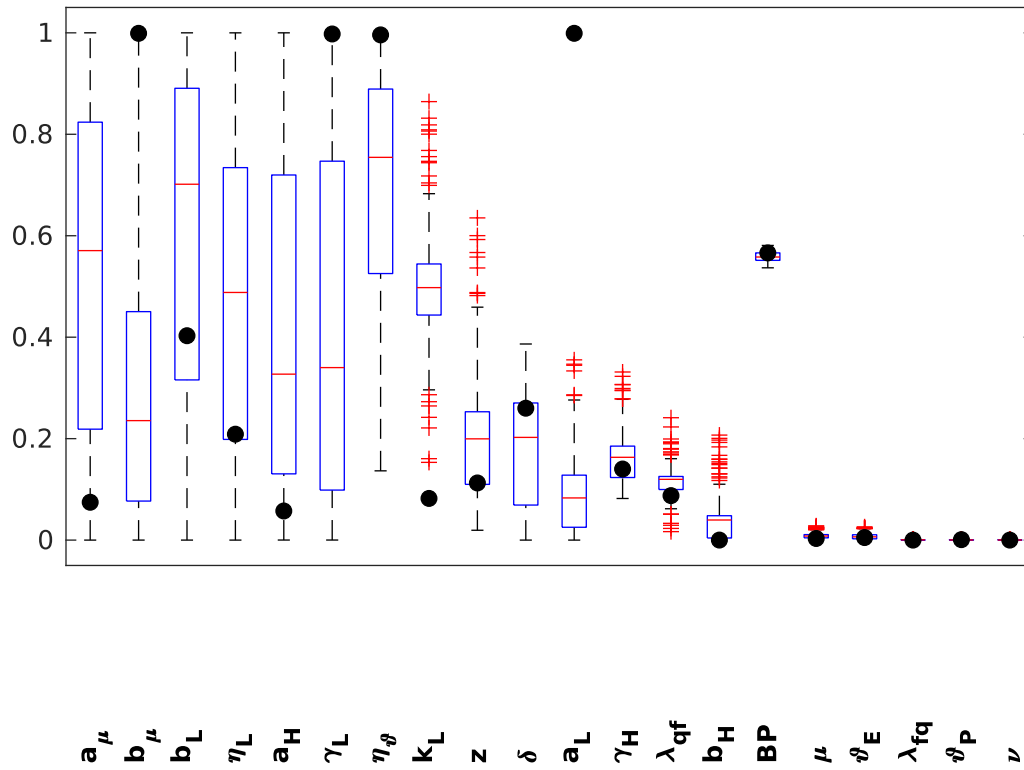
The number of estimations needed to perform the validation was1000.

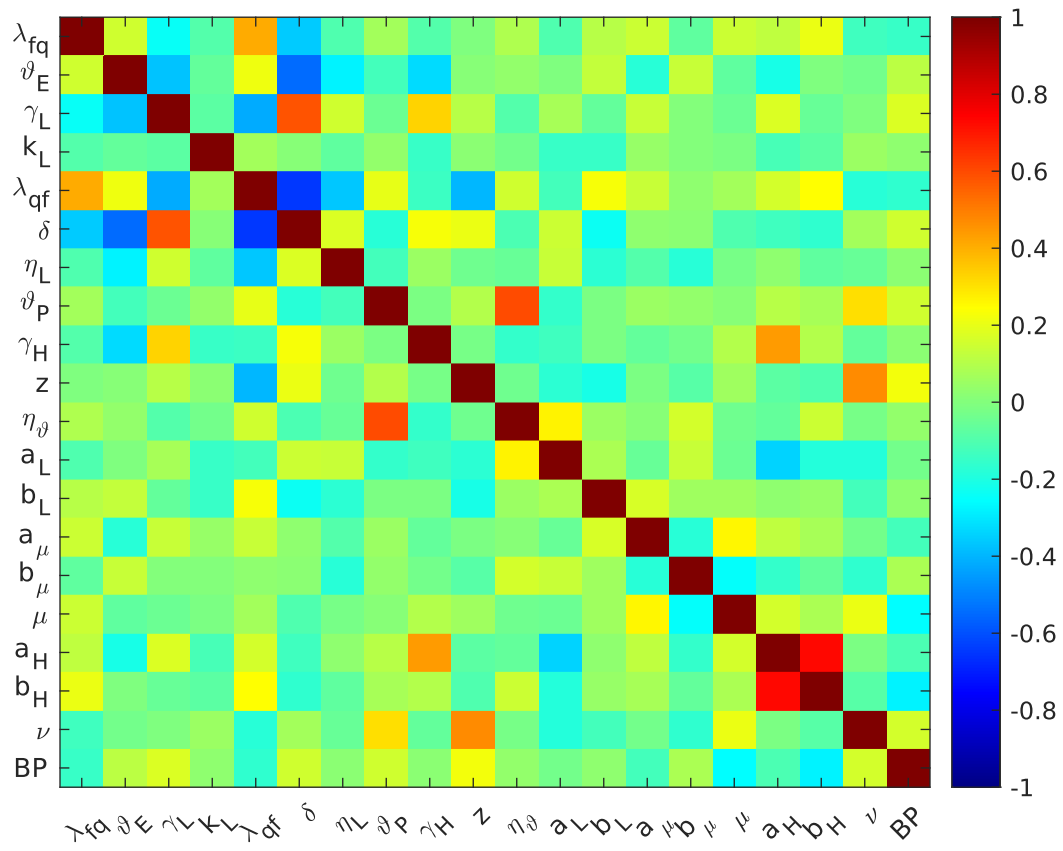
### 4.2. Estimated parameters with their intervals

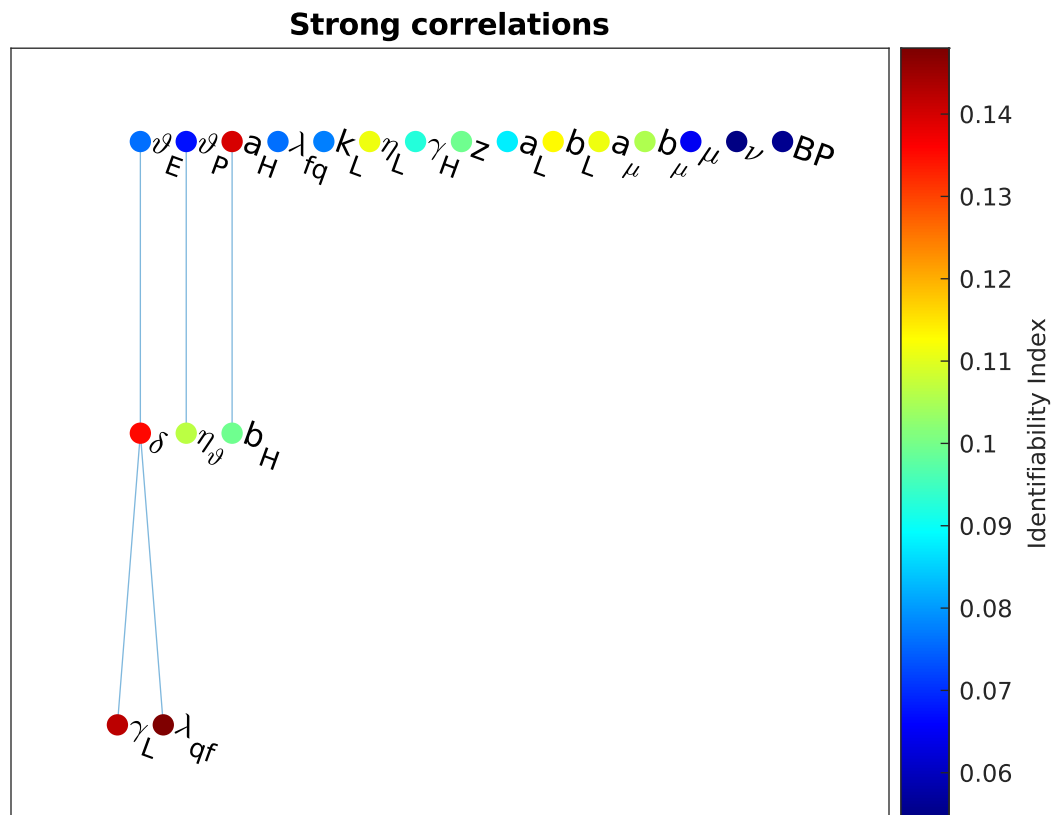
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0337'	'0.0005'	'0'	'0.0763'
$\vartheta_E$	'0.0047'	'0.0082'	'0.0064'	'0.005'	'0.0763'
$\gamma_L$	'0.2745'	'0.4056'	'0.3401'	'0.9977'	'0.1424'
$k_L$	'5.1398'	'5.8192'	'5.4795'	'1.7395'	'0.0778'
$\lambda_{qf}$	'0.0632'	'0.1764'	'0.1198'	'0.0877'	'0.148'
$\delta$	'0.0271'	'0.0337'	'0.0304'	'0.039'	'0.1352'
$\eta_L$	'0.4282'	'0.5481'	'0.4882'	'0.2088'	'0.1115'
$\vartheta_P$	'0.0001'	'0.0005'	'0.0003'	'0.0009'	'0.0673'
$\gamma_H$	'0.1262'	'0.2007'	'0.1635'	'0.1401'	'0.0925'
$z$	'4.6675'	'7.4103'	'6.0389'	'3.3795'	'0.0998'
$\eta_{\vartheta}$	'0.7122'	'0.7969'	'0.7545'	'0.9959'	'0.1064'
$a_L$	'1.7265'	'2.6138'	'2.1701'	'14.9865'	'0.088'
$b_L$	'9.9223'	'11.7204'	'10.8213'	'6.6408'	'0.1133'
$a_{\mu}$	'8.1117'	'9.8673'	'8.9895'	'2.0441'	'0.1114'
$b_{\mu}$	'3.486'	'5.1091'	'4.2975'	'14.9862'	'0.1056'
$\mu$	'0'	'0.0303'	'0.0081'	'0.0032'	'0.0648'
$a_H$	'4.7196'	'6.4403'	'5.58'	'1.8035'	'0.1398'
$b_H$	'1.1711'	'1.9502'	'1.5607'	'1.0007'	'0.0996'
$\nu$	'0'	'0.5758'	'0.1161'	'0.0029'	'0.0545'
BP	'117.7848'	'118.1109'	'117.9478'	'118.4989'	'0.0558'

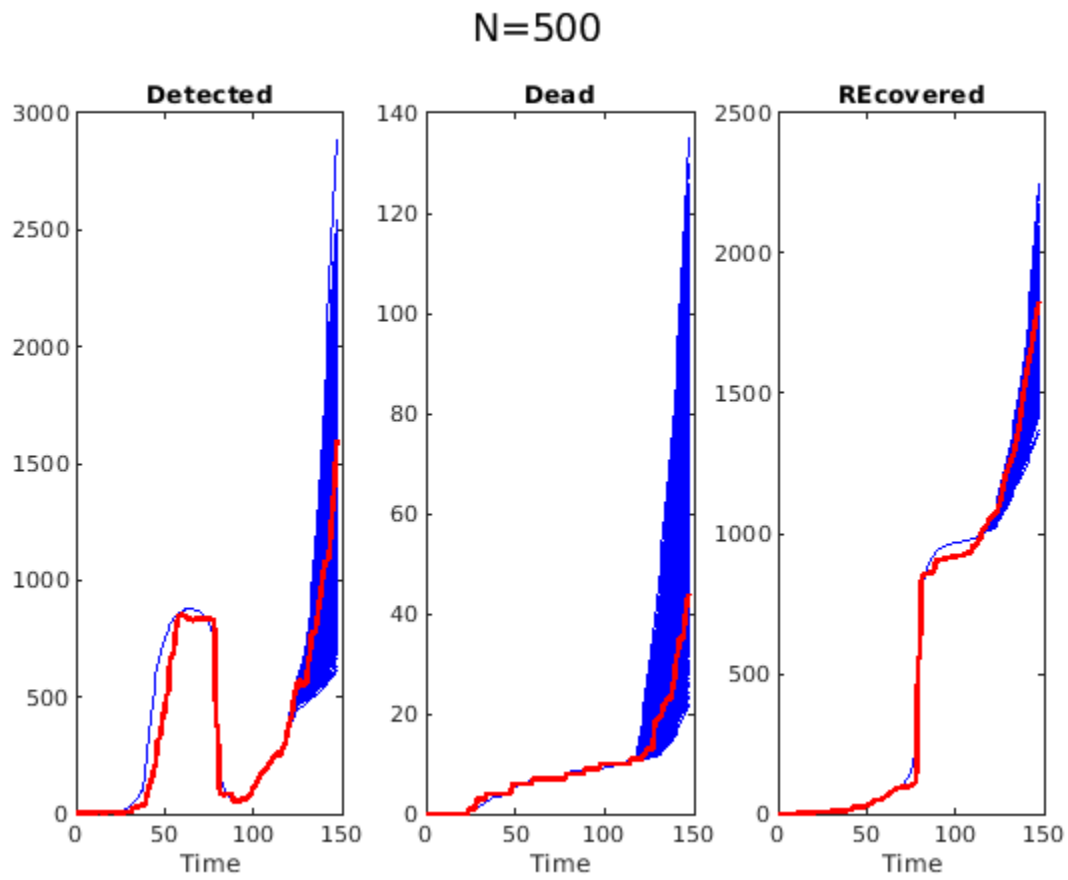
### 4.3. Identifiability analysis







#### 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 data148 to the 175. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was4000.

### 5.2. Estimated parameters with their intervals

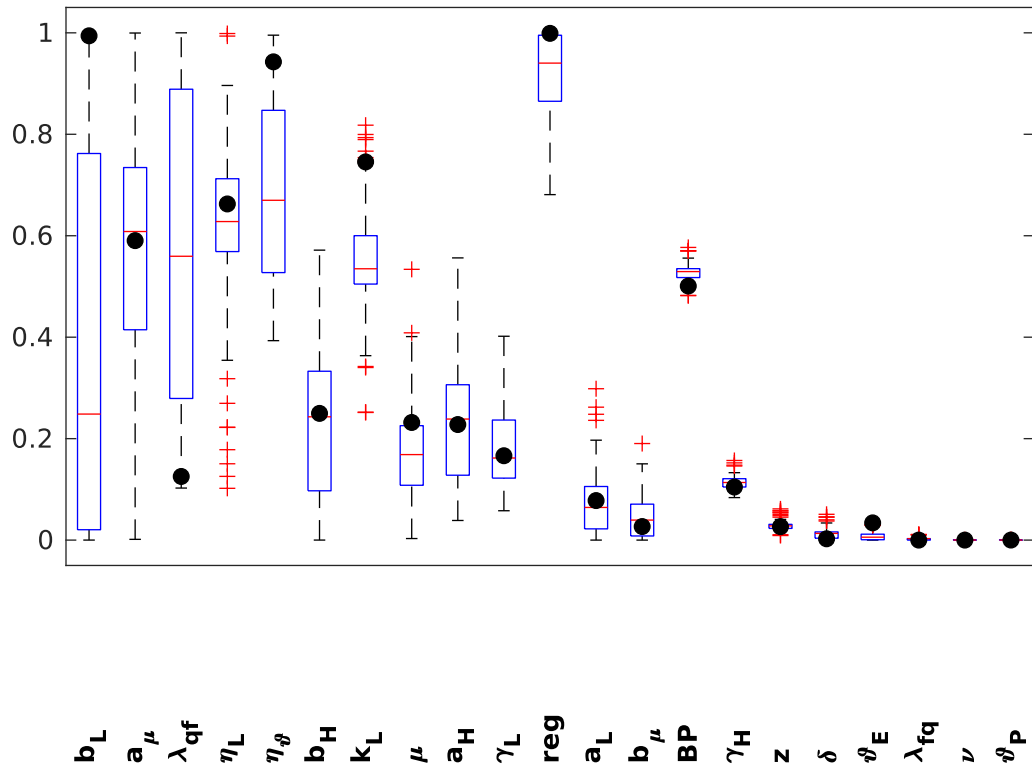
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

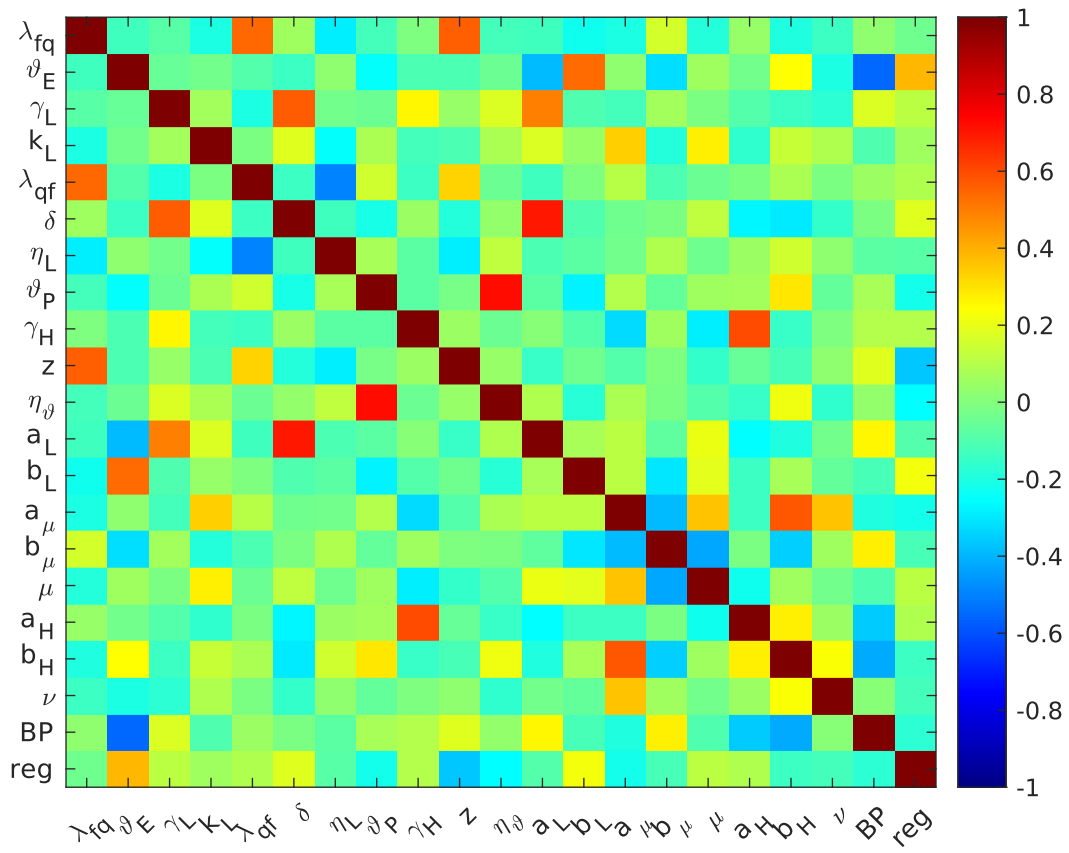
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

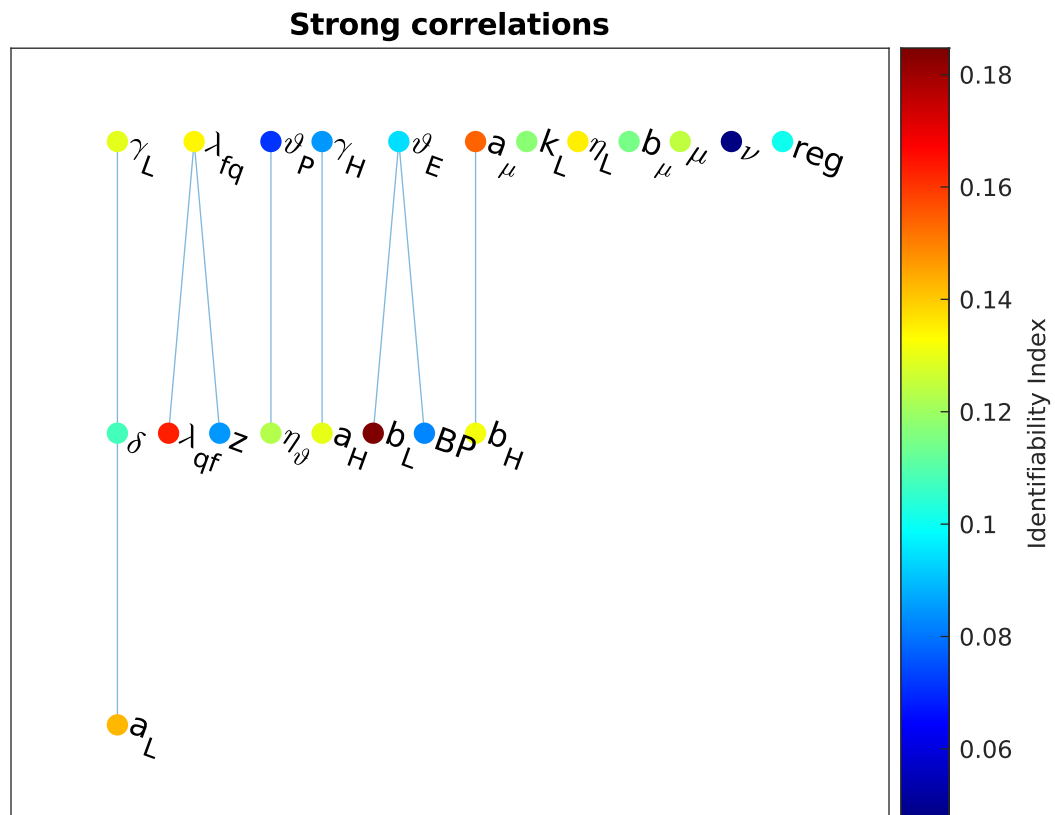
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0.0029'	'0'	'0.1341'
$\vartheta_E$	'0.023'	'0.034'	'0.0057'	'0.034'	'0.0946'
$\gamma_L$	'0.0946'	'0.209'	'0.1618'	'0.1663'	'0.1295'
$k_L$	'1.225'	'10'	'5.814'	'7.7098'	'0.1173'
$\lambda_{qf}$	'0'	'0.2823'	'0.5595'	'0.1254'	'0.1633'
$\delta$	'0'	'0.0008'	'0.002'	'0.0004'	'0.1078'
$\eta_L$	'0.1785'	'1'	'0.628'	'0.6627'	'0.135'
$\vartheta_P$	'0'	'0.0002'	'0.0001'	'0.0001'	'0.0716'
$\gamma_H$	'0.1007'	'0.2169'	'0.1135'	'0.1046'	'0.0846'
$z$	'0.771'	'1.6783'	'0.8418'	'0.7953'	'0.0847'
$\eta_{\vartheta}$	'0.7539'	'0.9874'	'0.6699'	'0.9428'	'0.1229'
$a_L$	'1.1429'	'6.0132'	'1.9013'	'2.0909'	'0.1429'
$b_L$	'6.2138'	'15'	'4.4783'	'14.9181'	'0.1847'
$a_{\mu}$	'8.6812'	'14.416'	'9.5165'	'9.2652'	'0.1539'
$b_{\mu}$	'1'	'2.0949'	'1.5524'	'1.3741'	'0.1148'
$\mu$	'0.0606'	'0.4415'	'0.1686'	'0.2319'	'0.1247'
$a_H$	'2.4427'	'5.4539'	'4.3408'	'4.1892'	'0.1296'
$b_H$	'4.4039'	'7.3664'	'4.4026'	'4.4971'	'0.1316'
$\nu$	'0'	'0.003'	'0.0795'	'0.0013'	'0.0477'
BP	'146.5267'	'153.2058'	'148.1716'	'146.5474'	'0.0829'
reg	'0.1454'	'0.25'	'0.2351'	'0.2497'	'0.1007'



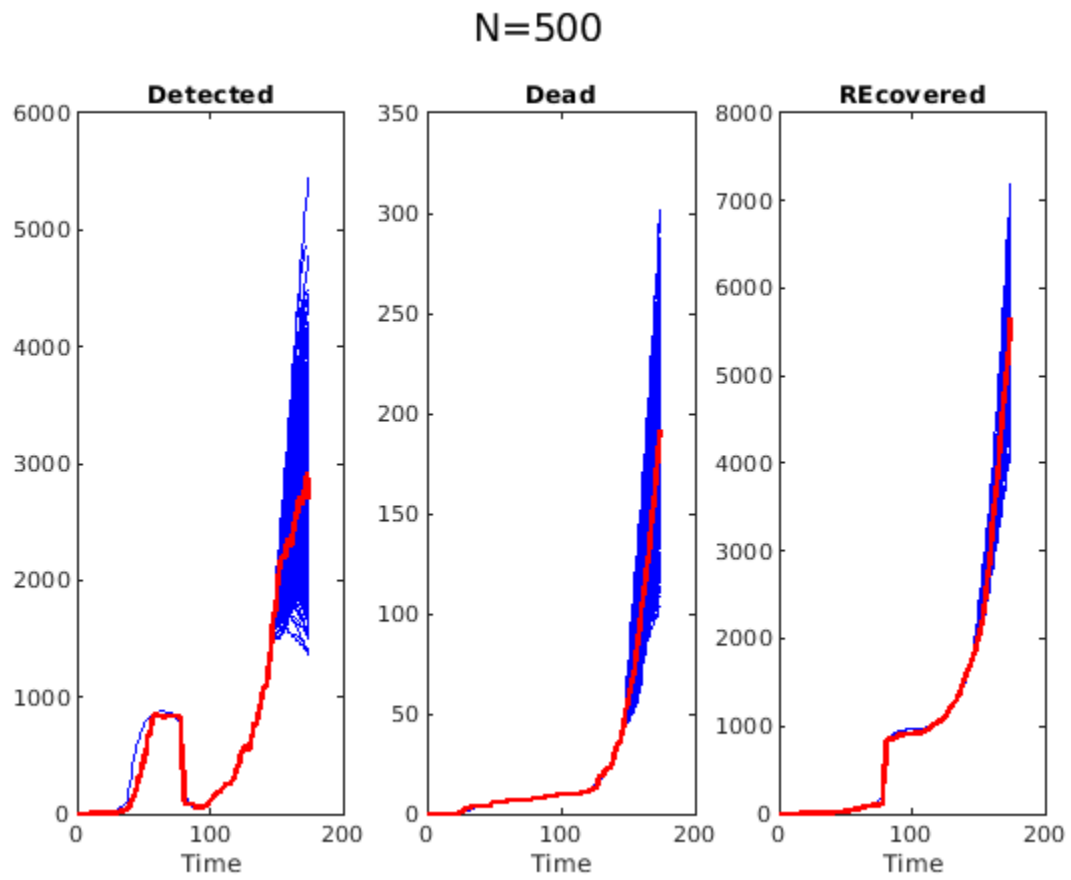
### 5.3. Identifiability analysis







## 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 data175 to the 201. The status of the validation is: COMPLETED.

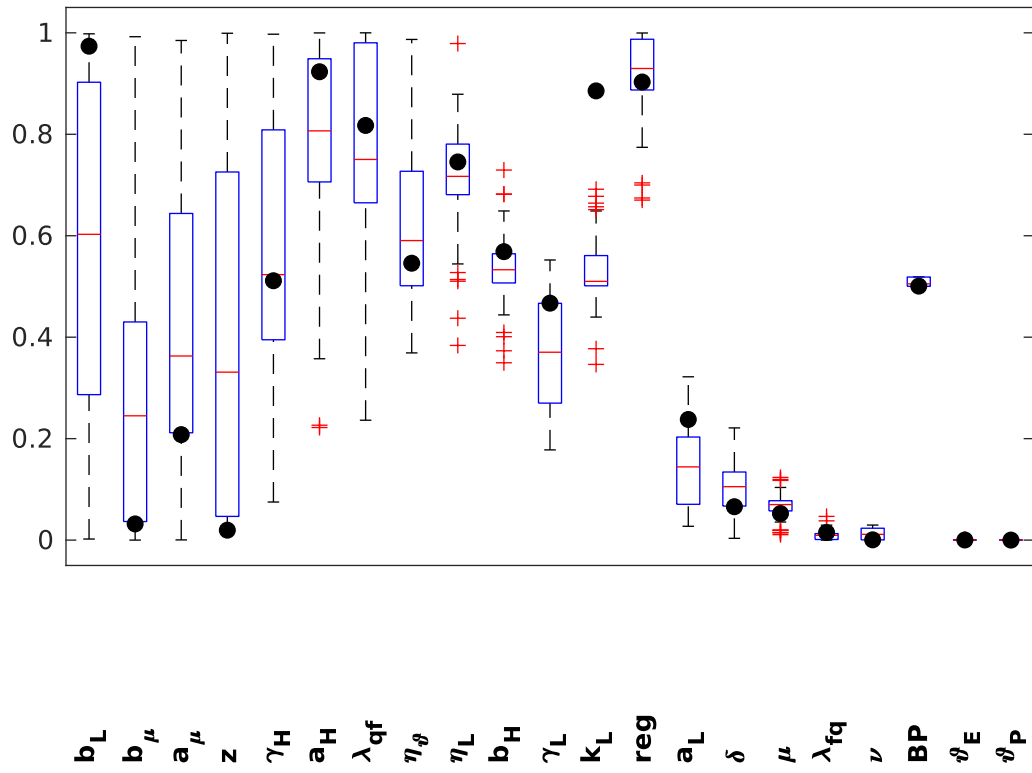
The number of estimations needed to perform the validation was3000.

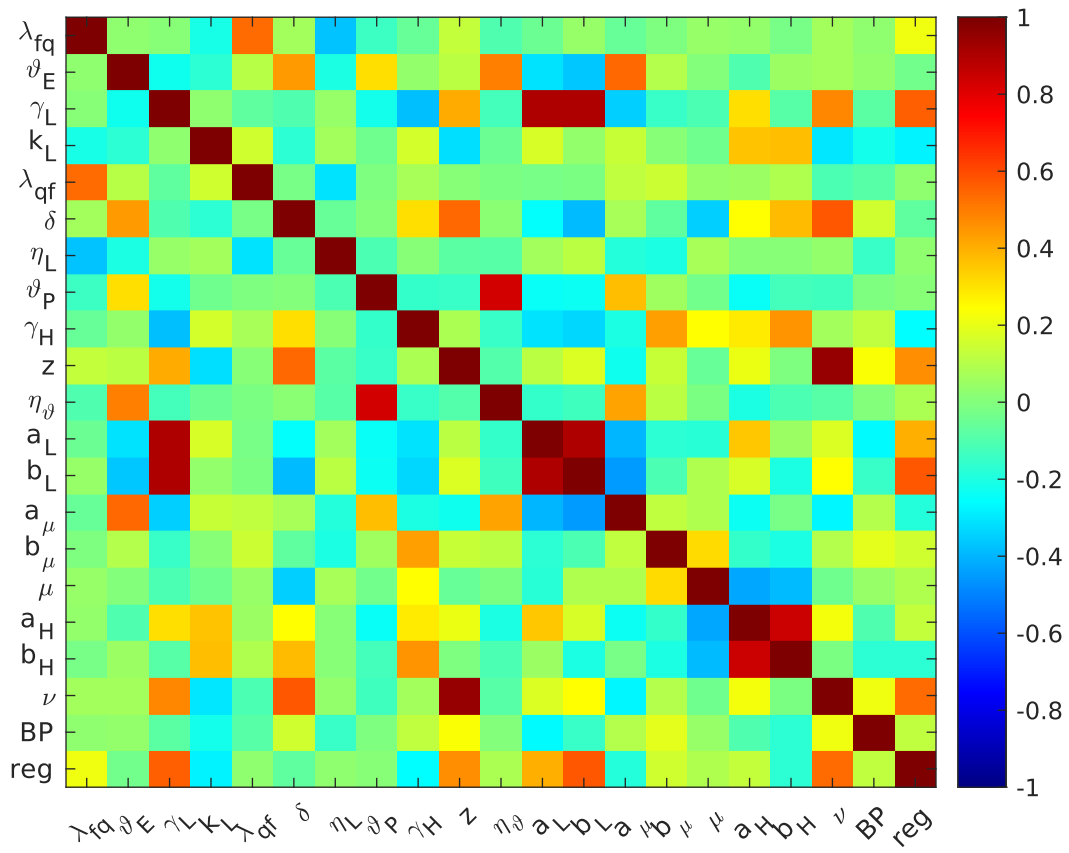
### 6.2. Estimated parameters with their intervals

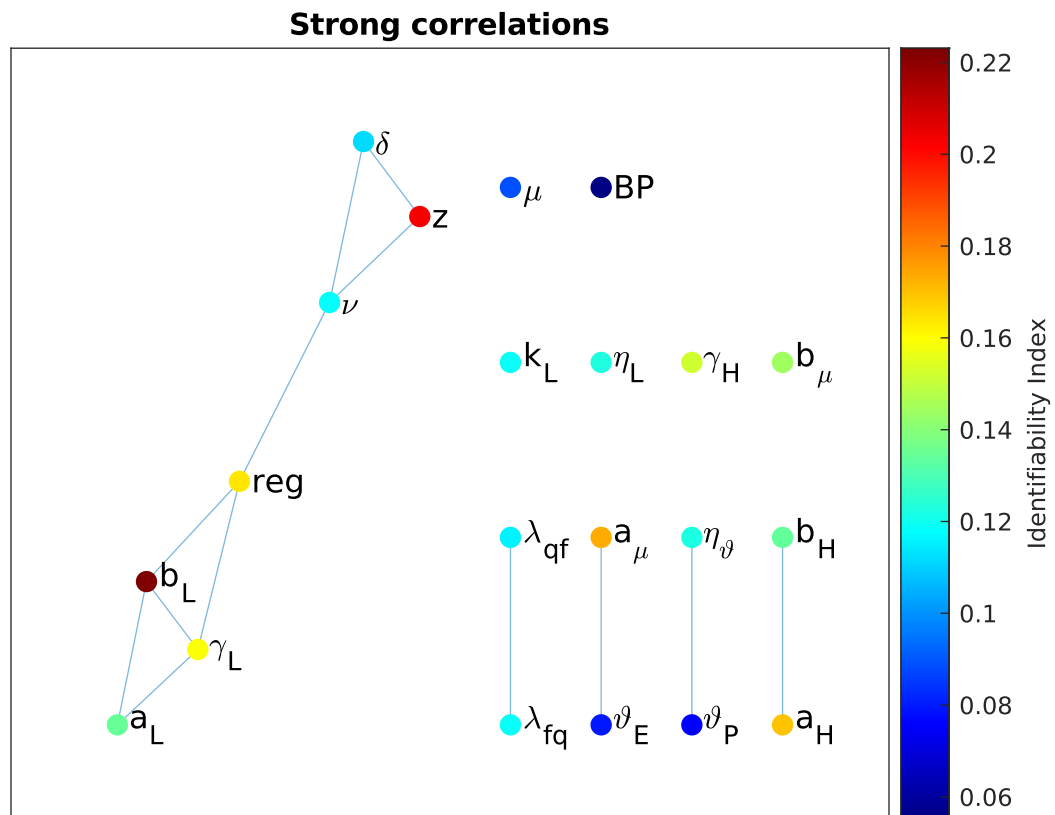
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.1152'	'0.0094'	'0.0149'	'0.1193'
$\vartheta_E$	'0'	'0.0004'	'0.0002'	'0.0002'	'0.0801'
$\gamma_L$	'0.3362'	'0.4045'	'0.3704'	'0.4671'	'0.159'
$k_L$	'5.0798'	'6.1011'	'5.5904'	'8.9697'	'0.1193'
$\lambda_{qf}$	'0.6936'	'0.8072'	'0.7504'	'0.8174'	'0.1159'
$\delta$	'0.0138'	'0.0178'	'0.0158'	'0.0099'	'0.1118'
$\eta_L$	'0.6434'	'0.7906'	'0.717'	'0.7455'	'0.1235'
$\vartheta_P$	'0'	'0.0002'	'0.0001'	'0'	'0.0758'
$\gamma_H$	'0.4443'	'0.6024'	'0.5233'	'0.5113'	'0.1517'
$z$	'6.8742'	'12.9905'	'9.9323'	'0.5864'	'0.2029'
$\eta_{\vartheta}$	'0.5422'	'0.6387'	'0.5905'	'0.5458'	'0.1228'
$a_L$	'2.7115'	'3.3301'	'3.0208'	'4.3292'	'0.1347'
$b_L$	'8.0832'	'10.7949'	'9.4391'	'14.6308'	'0.2231'
$a_{\mu}$	'4.9077'	'7.2546'	'6.0812'	'3.9109'	'0.1734'
$b_{\mu}$	'3.2286'	'5.6323'	'4.4304'	'1.4465'	'0.1442'
$\mu$	'0.0359'	'0.1041'	'0.07'	'0.0524'	'0.0894'
$a_H$	'11.1939'	'13.3951'	'12.2945'	'13.9259'	'0.17'
$b_H$	'7.7027'	'9.2198'	'8.4612'	'8.9608'	'0.1345'
$\nu$	'3.9571'	'7.3901'	'5.6736'	'0.273'	'0.1185'
BP	'174.637'	'174.9116'	'174.7743'	'174.5364'	'0.0554'
reg	'0.2193'	'0.2455'	'0.2324'	'0.2258'	'0.1638'

### 6.3. Identifiability analysys

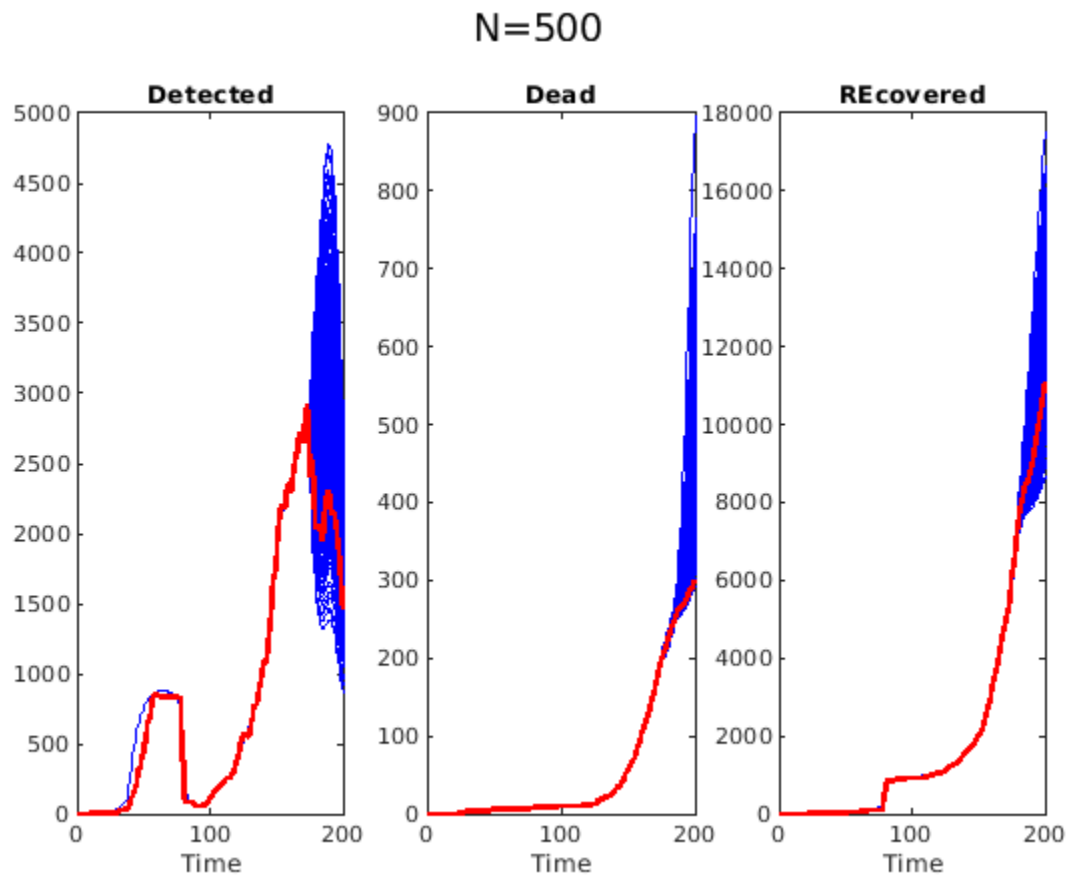








## 6.4. Uncertainty analysis



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## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data201 to the 234. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

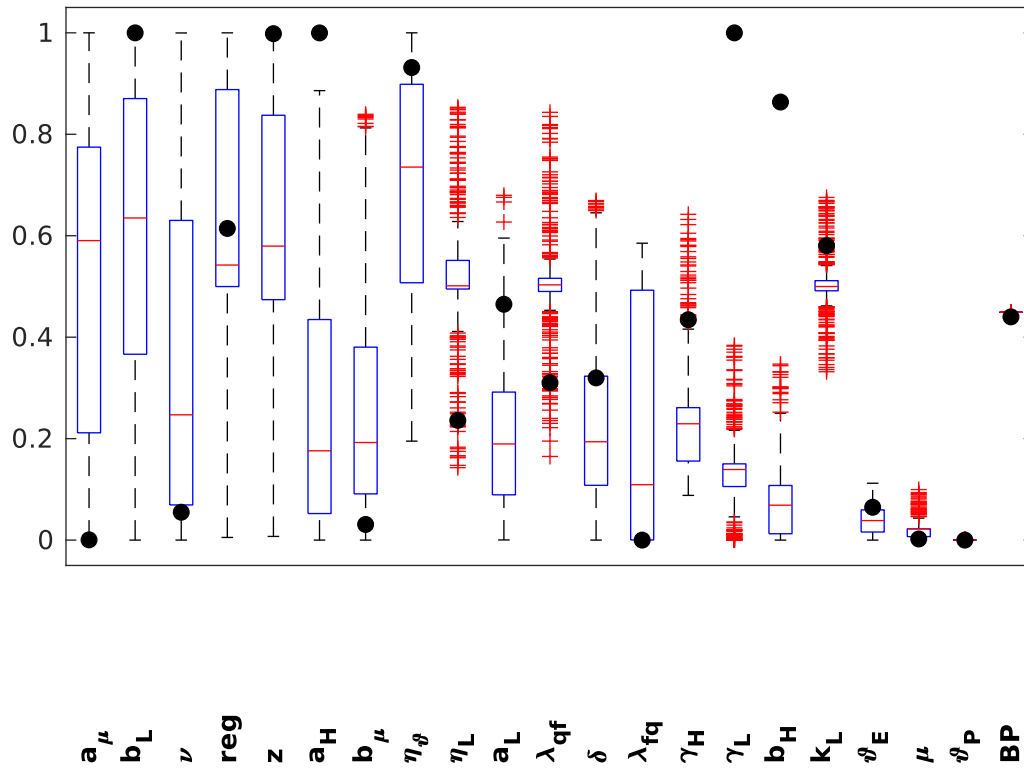
### 7.2. Estimated parameters with their intervals

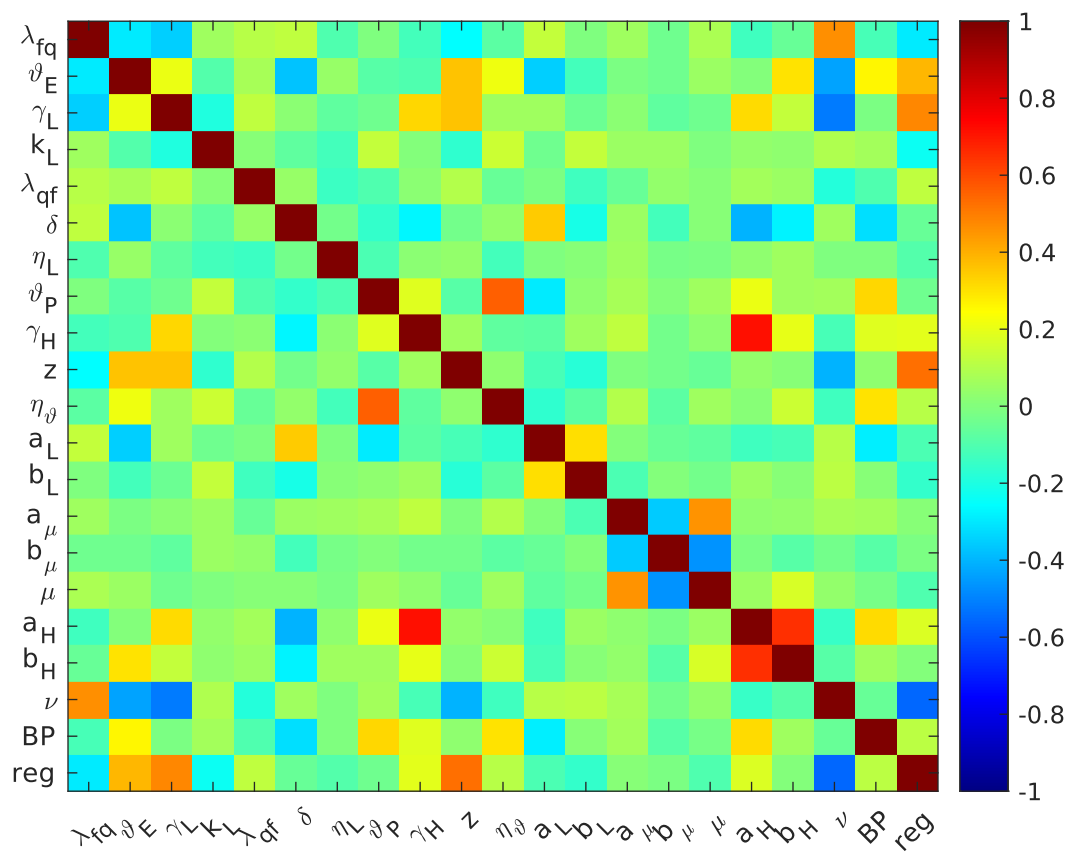
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

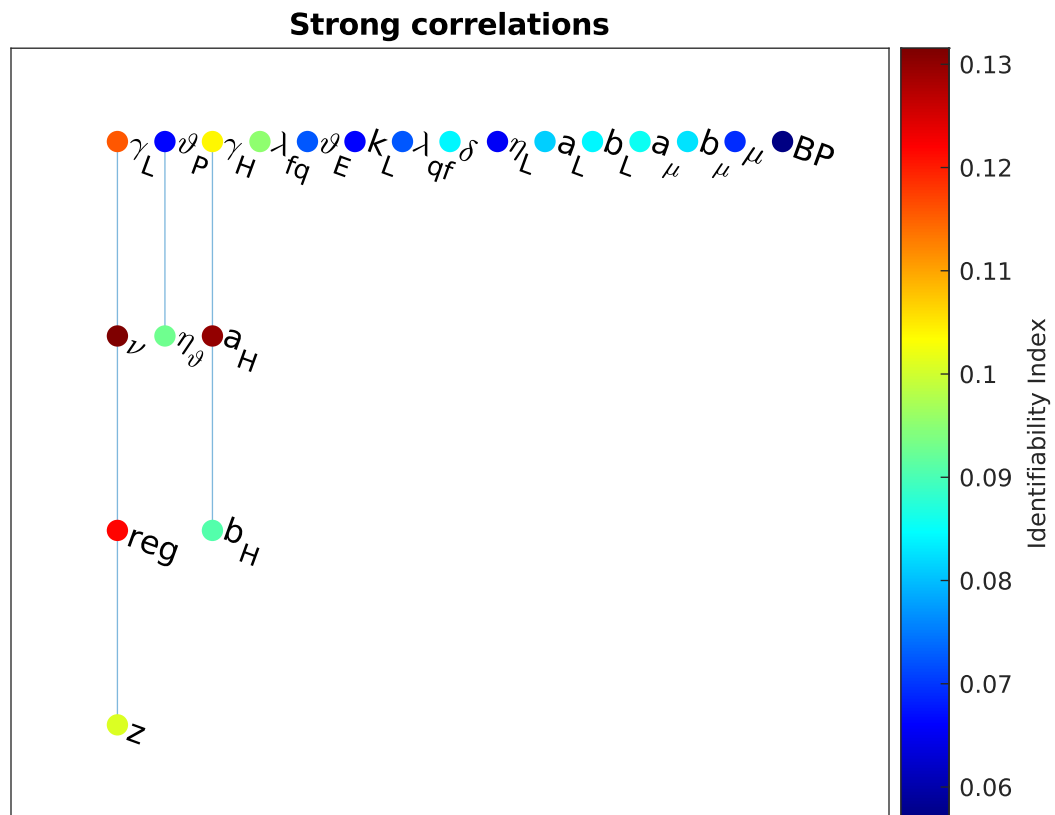
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0001'	'0.1092'	'0'	'0.0952'
$\vartheta_E$	'0.0487'	'0.0874'	'0.0385'	'0.0647'	'0.0726'
$\gamma_L$	'0.271'	'1'	'0.1391'	'0.9999'	'0.1155'
$k_L$	'1'	'9.1'	'5.4987'	'6.2235'	'0.0661'
$\lambda_{qf}$	'0'	'0.6983'	'0.5032'	'0.3104'	'0.0725'
$\delta$	'0.0315'	'0.0654'	'0.0291'	'0.048'	'0.0842'
$\eta_L$	'0.2136'	'0.5311'	'0.5013'	'0.2361'	'0.0656'
$\vartheta_P$	'0'	'0'	'0.0001'	'0'	'0.0665'
$\gamma_H$	'0.1305'	'0.8515'	'0.2293'	'0.4344'	'0.1039'
$z$	'10.8521'	'30'	'17.3871'	'29.9494'	'0.1009'
$\eta_{\vartheta}$	'0.4804'	'1'	'0.7353'	'0.9315'	'0.093'
$a_L$	'1'	'14.3'	'3.6534'	'7.5086'	'0.0814'
$b_L$	'1'	'15'	'9.8902'	'14.999'	'0.0843'
$a_{\mu}$	'1'	'14.3'	'9.2656'	'1.0069'	'0.0857'
$b_{\mu}$	'1'	'15'	'3.6928'	'1.4317'	'0.0829'
$\mu$	'0'	'0.005'	'0.0222'	'0.0022'	'0.0693'
$a_H$	'8.088'	'15'	'3.4643'	'14.9974'	'0.13'
$b_H$	'5.5761'	'13.9264'	'1.9632'	'13.0894'	'0.0908'
$\nu$	'24.2303'	'40.4501'	'123.4818'	'27.4808'	'0.1316'
BP	'200.7728'	'204.0284'	'201.5'	'200.9632'	'0.057'
reg	'0.1405'	'0.2093'	'0.1356'	'0.1536'	'0.1217'

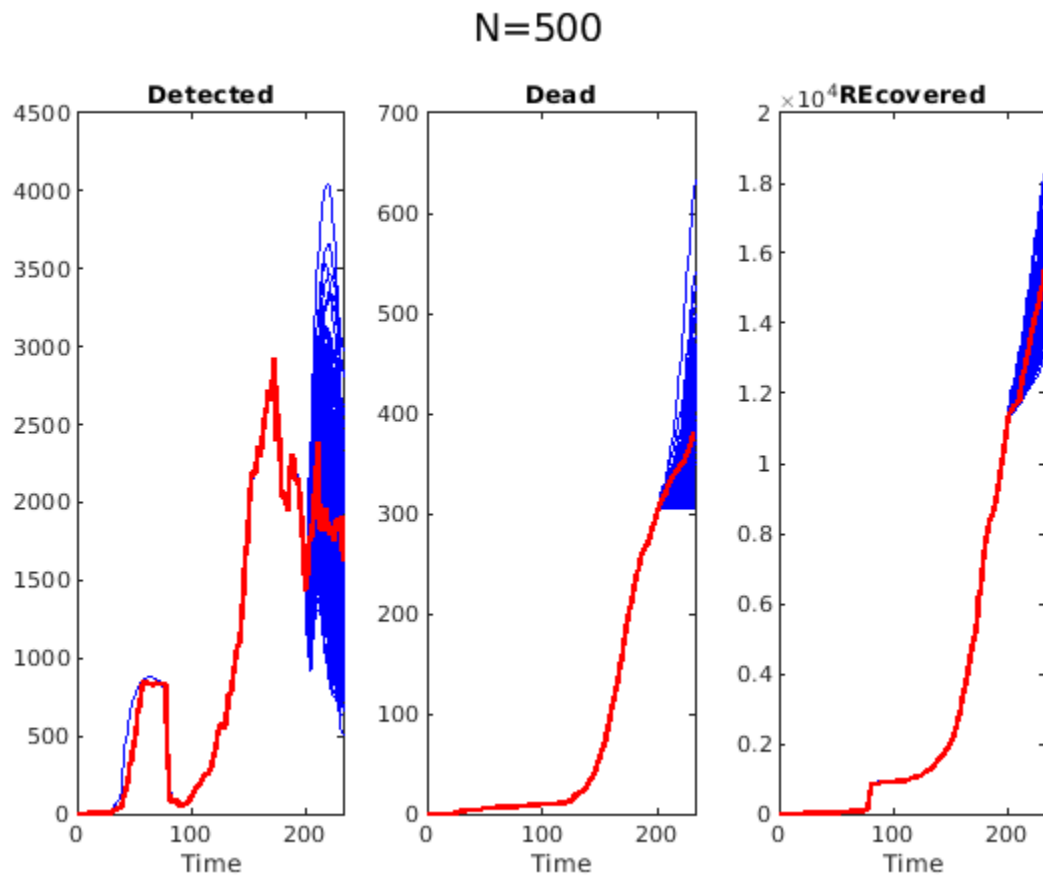
### 7.3. Identifiability analysis







## 7.4. Uncertainty analysys



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## Chapter 8. Extension number8

### 8.1. Basic information

The extension to be validated consists of the time series from the data234 to the 320. The status of the validation is: COMPLETED.

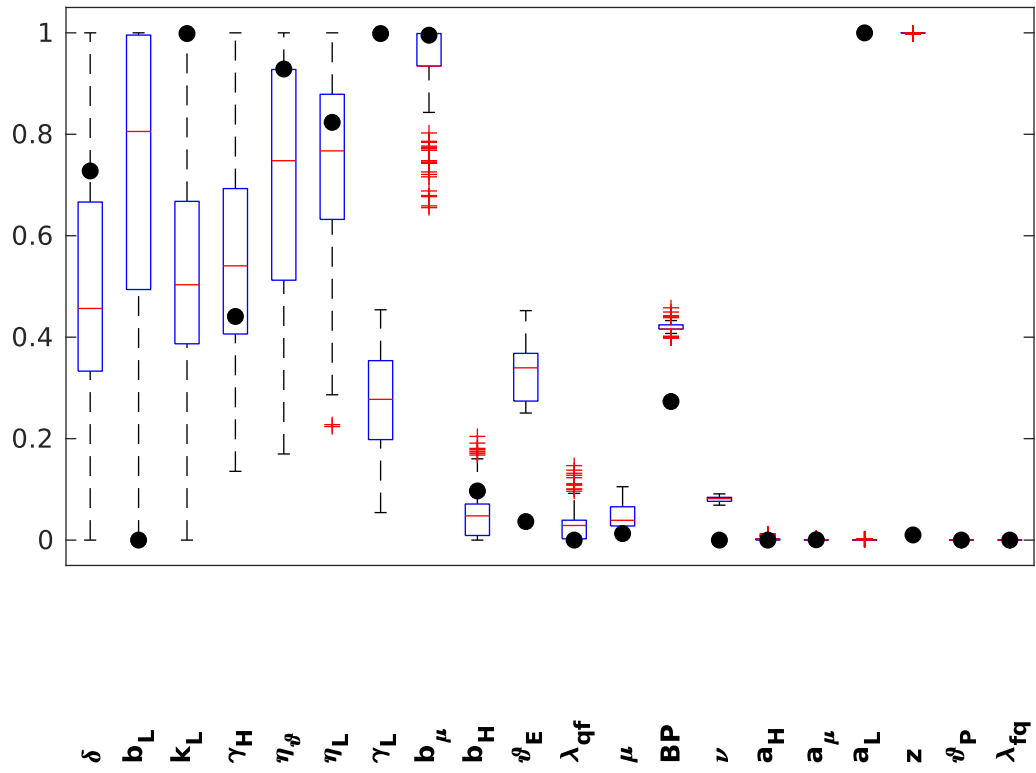
The number of estimations needed to perform the validation was1000.

### 8.2. Estimated parameters with their intervals

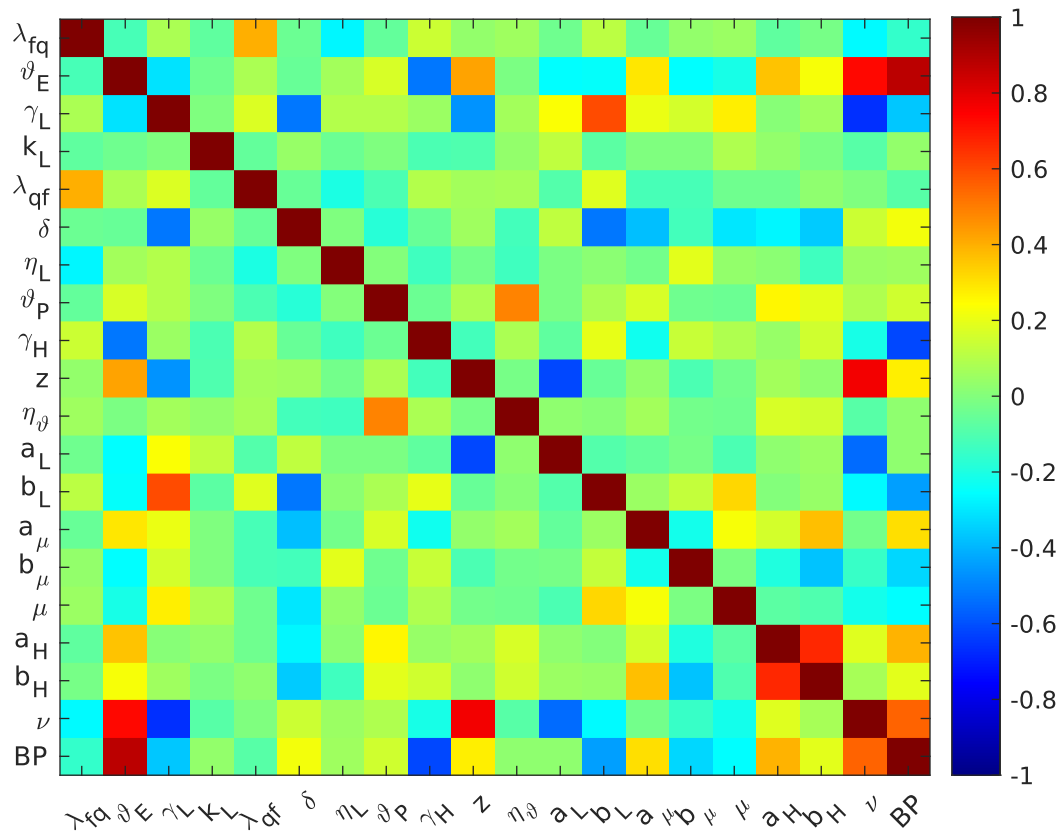
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

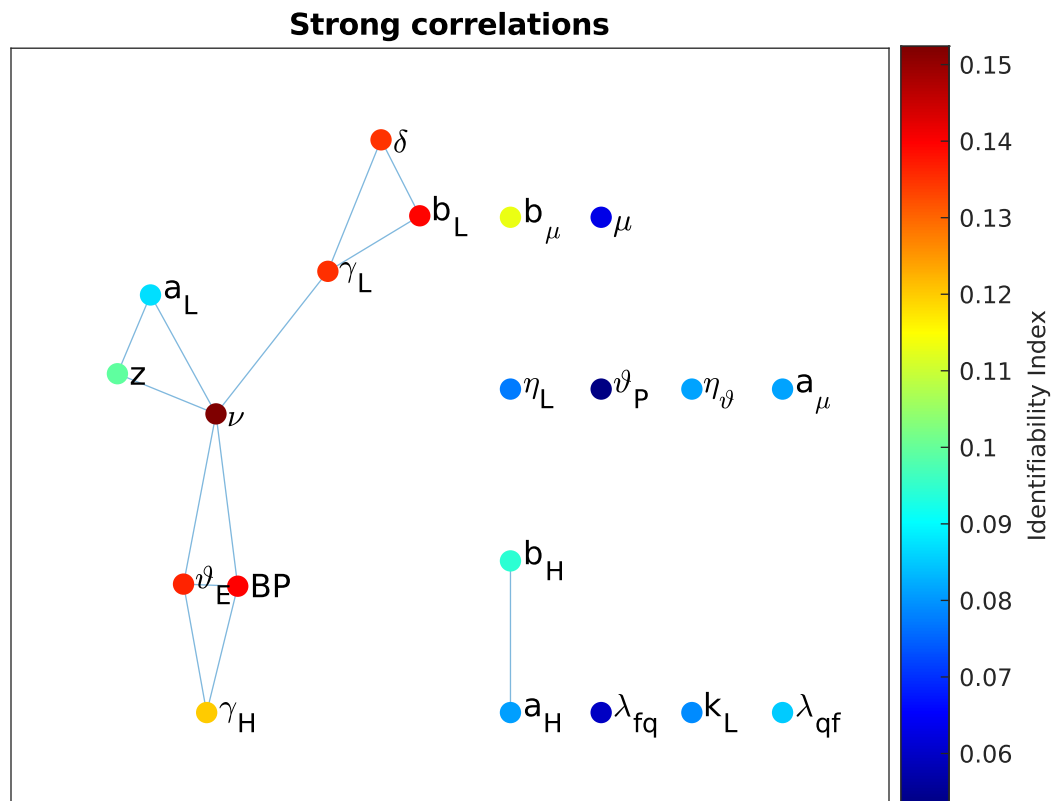
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0183'	'0'	'0'	'0.0599'
$\vartheta_E$	'0.331'	'0.3482'	'0.3396'	'0.0365'	'0.1364'
$\gamma_L$	'0.2605'	'0.2944'	'0.2775'	'0.9986'	'0.135'
$k_L$	'5.1491'	'5.9122'	'5.5307'	'9.9869'	'0.0793'
$\lambda_{qf}$	'0'	'0.0706'	'0.0289'	'0'	'0.0852'
$\delta$	'0.0624'	'0.0746'	'0.0685'	'0.1092'	'0.1347'
$\eta_L$	'0.7333'	'0.8013'	'0.7673'	'0.8235'	'0.0777'
$\vartheta_P$	'0'	'0'	'0'	'0.0001'	'0.0534'
$\gamma_H$	'0.5088'	'0.5725'	'0.5407'	'0.4408'	'0.1201'
$z$	'29.5646'	'30'	'29.9893'	'0.3033'	'0.0994'
$\eta_{\vartheta}$	'0.7127'	'0.7832'	'0.7479'	'0.9286'	'0.0815'
$a_L$	'1'	'1.1714'	'1.0064'	'14.9984'	'0.0874'
$b_L$	'11.6271'	'12.9286'	'12.2779'	'1.0006'	'0.1395'
$a_{\mu}$	'1'	'1.5366'	'1.0086'	'1.0082'	'0.0814'
$b_{\mu}$	'13.304'	'14.8613'	'14.0827'	'14.9348'	'0.113'
$\mu$	'0.0318'	'0.0463'	'0.039'	'0.0129'	'0.0634'
$a_H$	'1'	'1.1524'	'1.0331'	'1'	'0.081'
$b_H$	'1.4299'	'1.9079'	'1.6689'	'2.3569'	'0.0946'
$\nu$	'40.3202'	'41.5083'	'40.9142'	'0'	'0.1524'
BP	'249.2594'	'251.7406'	'250.5'	'233.5113'	'0.1399'

## 8.3. Identifiability analysis

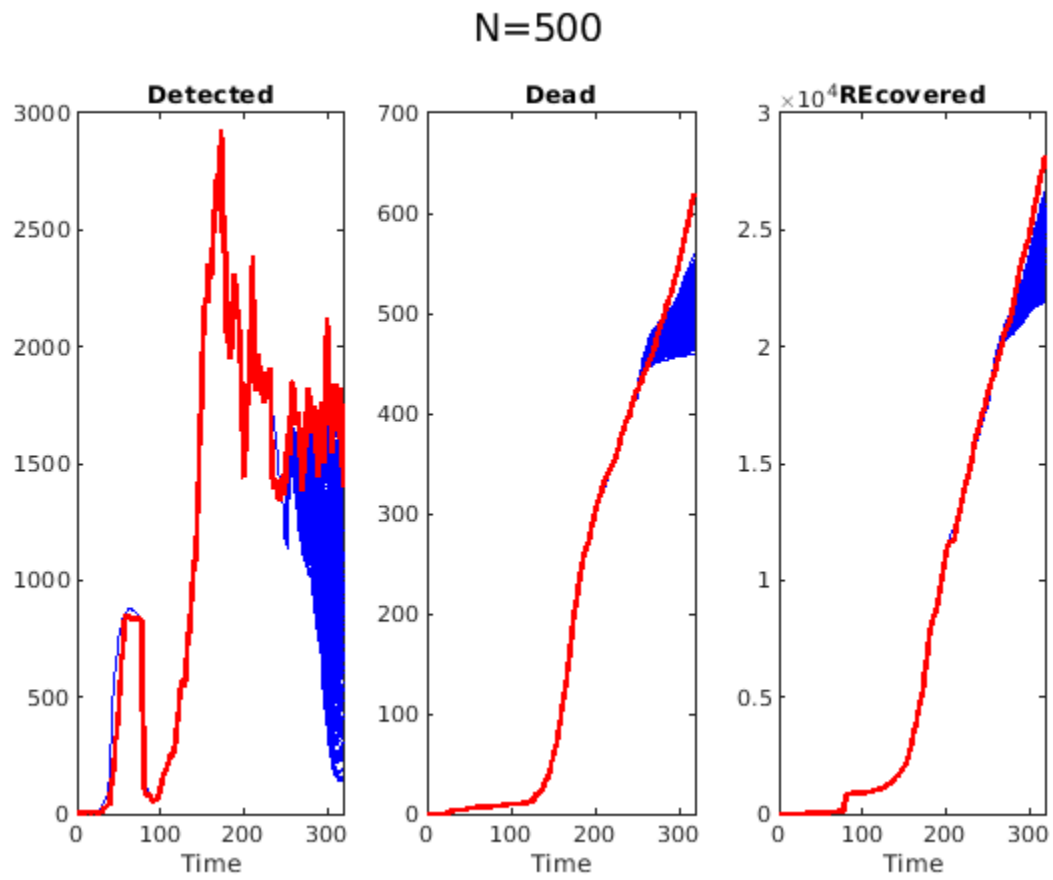








## 8.4. Uncertainty analysis



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## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data320 to the 339. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

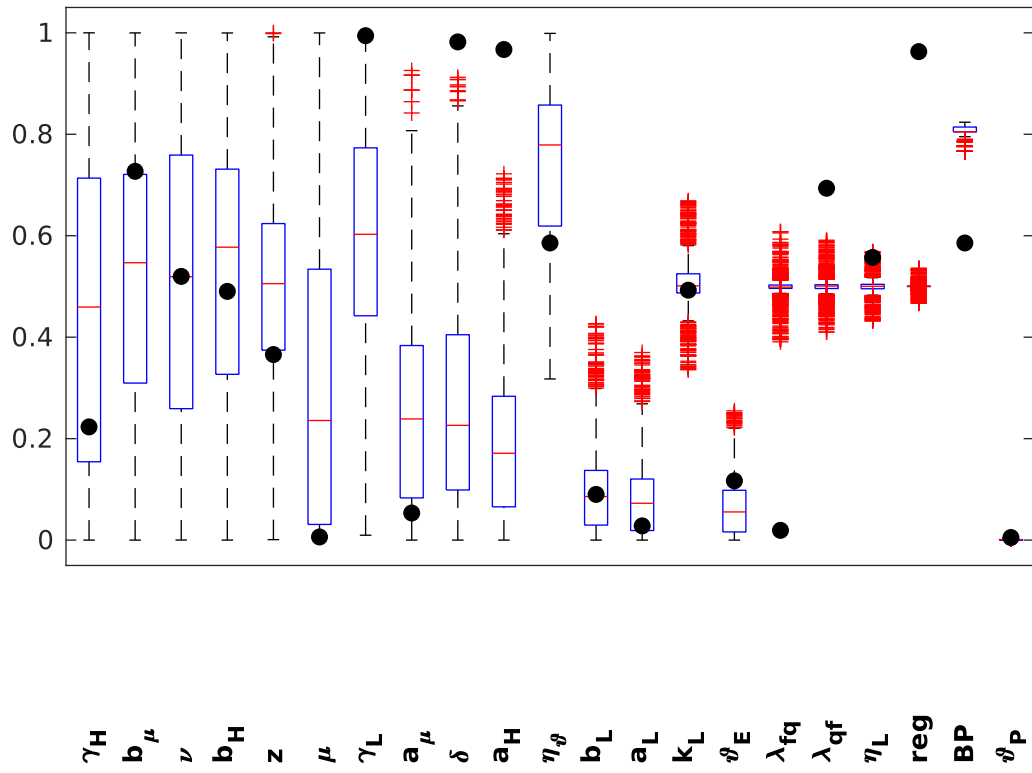
### 9.2. Estimated parameters with their intervals

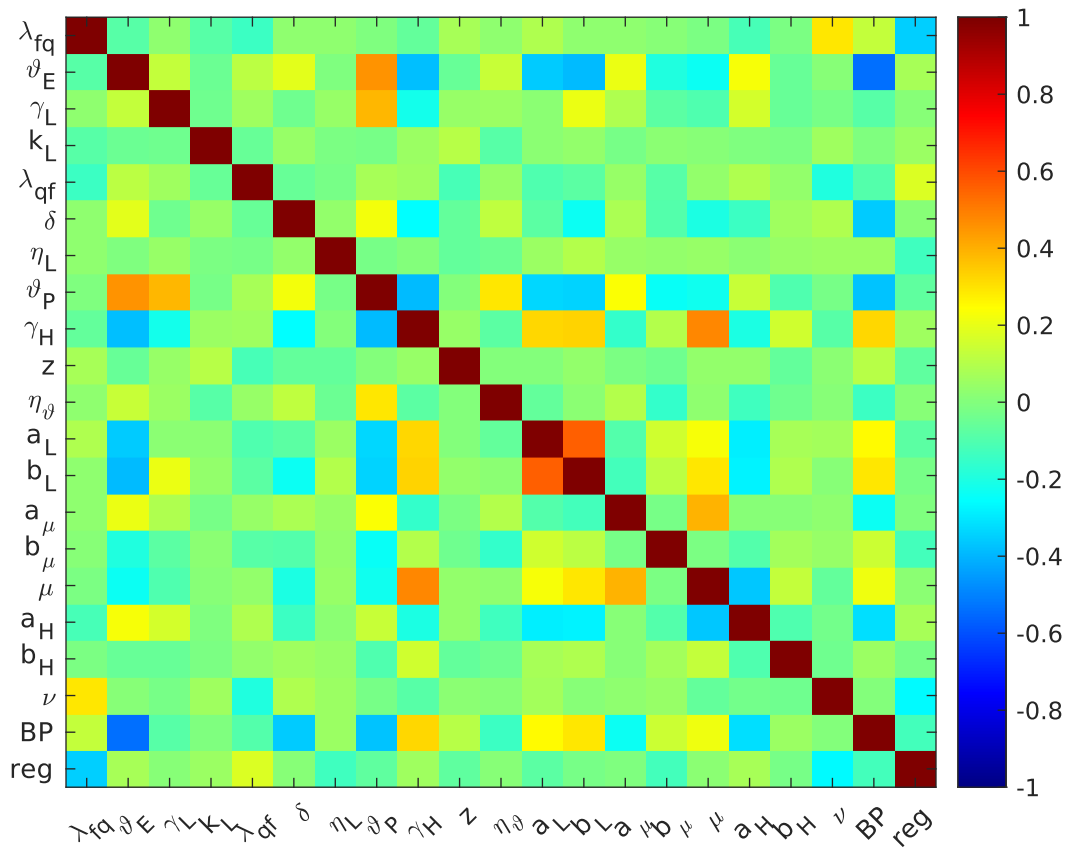
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

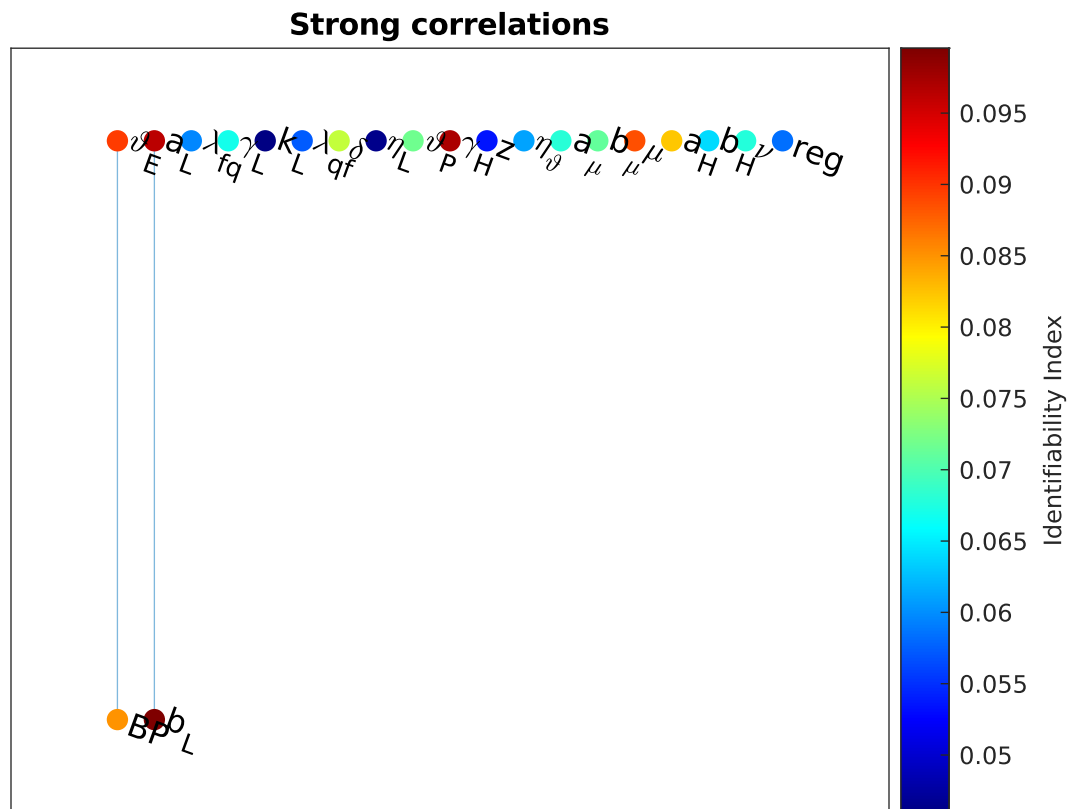
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0011'	'0.0433'	'0.4988'	'0.0192'	'0.0598'
$\vartheta_E$	'0'	'0.2629'	'0.0555'	'0.1168'	'0.0896'
$\gamma_L$	'0.3816'	'1'	'0.6028'	'0.9943'	'0.0671'
$k_L$	'1'	'9.55'	'5.5105'	'5.434'	'0.046'
$\lambda_{qf}$	'0'	'1'	'0.5008'	'0.6936'	'0.0574'
$\delta$	'0.0916'	'0.15'	'0.034'	'0.1473'	'0.0763'
$\eta_L$	'0.025'	'1'	'0.5003'	'0.5572'	'0.0465'
$\vartheta_P$	'0'	'0.0085'	'0.001'	'0.0051'	'0.0718'
$\gamma_H$	'0.1421'	'0.2324'	'0.4594'	'0.2232'	'0.0971'
$z$	'0'	'24.692'	'15.1669'	'10.9742'	'0.0537'
$\eta_{\vartheta}$	'0.5666'	'0.9181'	'0.7785'	'0.5857'	'0.0611'
$a_L$	'1.1761'	'3.5829'	'2.0236'	'1.3926'	'0.0964'
$b_L$	'1.7886'	'5.7665'	'2.2025'	'2.2615'	'0.0995'
$a_{\mu}$	'1.7'	'15'	'4.3472'	'1.748'	'0.0681'
$b_{\mu}$	'1'	'15'	'8.6544'	'11.1778'	'0.0711'
$\mu$	'0'	'0.0128'	'0.2358'	'0.0062'	'0.0885'
$a_H$	'10.1388'	'15'	'3.3969'	'14.5397'	'0.0822'
$b_H$	'4.6547'	'9.4619'	'9.0837'	'7.8641'	'0.0642'
$\nu$	'159.7737'	'482.9887'	'259.5911'	'259.9267'	'0.0678'
BP	'295.1967'	'299.8831'	'318.5'	'295.5'	'0.085'
reg	'0.0063'	'0.25'	'0.1251'	'0.2407'	'0.0585'

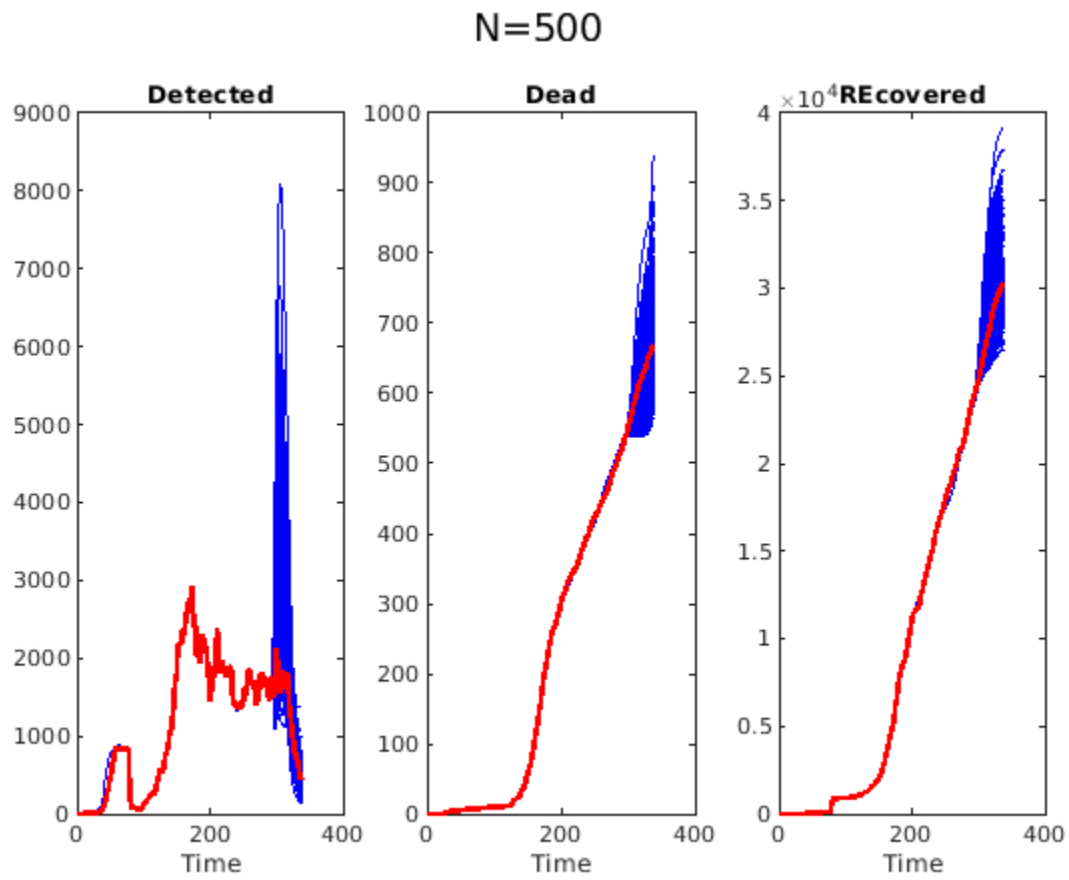
### 9.3. Identifiability analysis







## 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 data339 to the 437. The status of the validation is: COMPLETED.

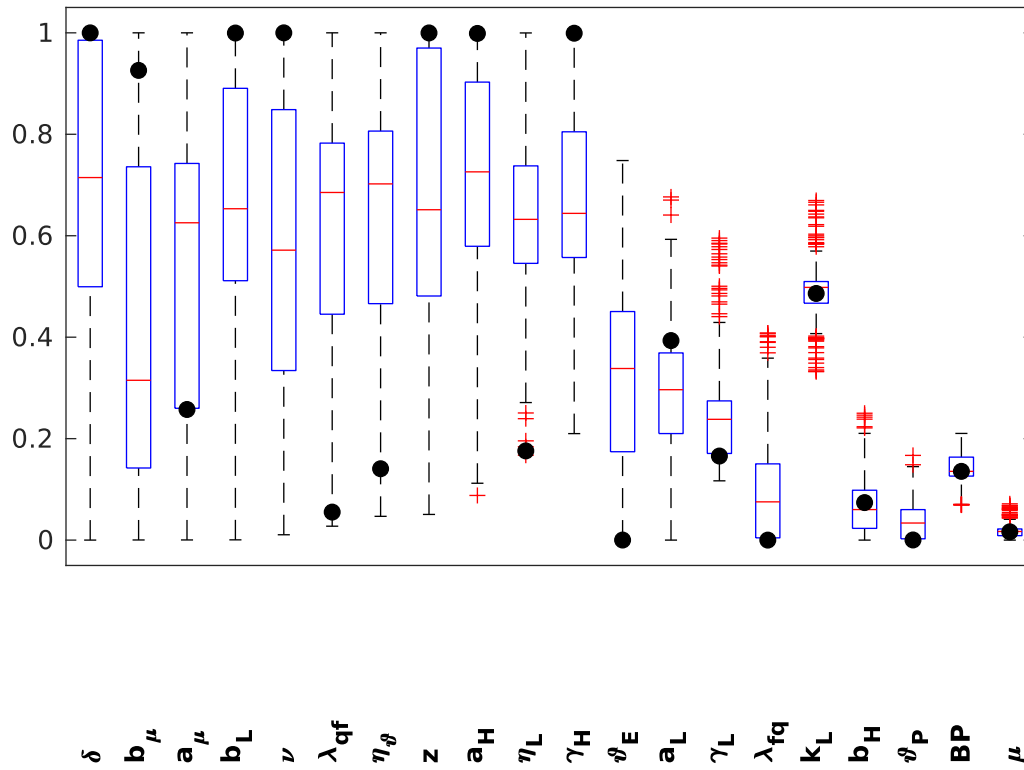
The number of estimations needed to perform the validation was1000.

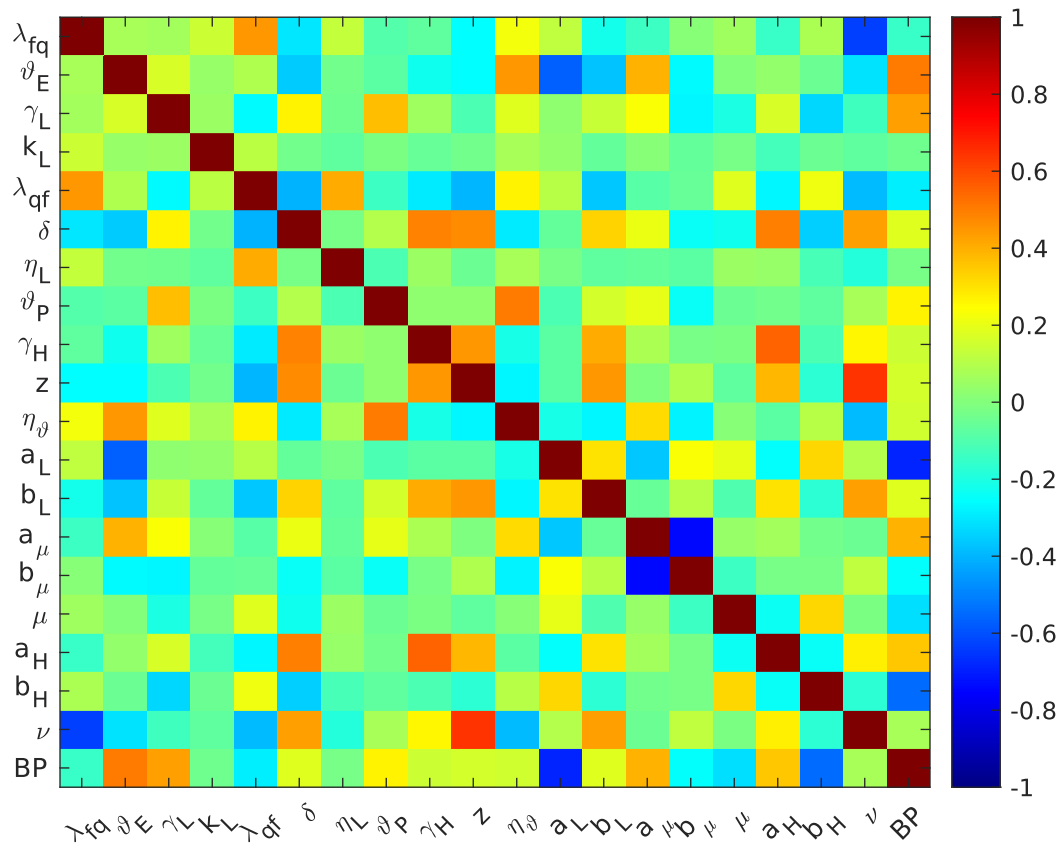
### 10.2. Estimated parameters with their intervals

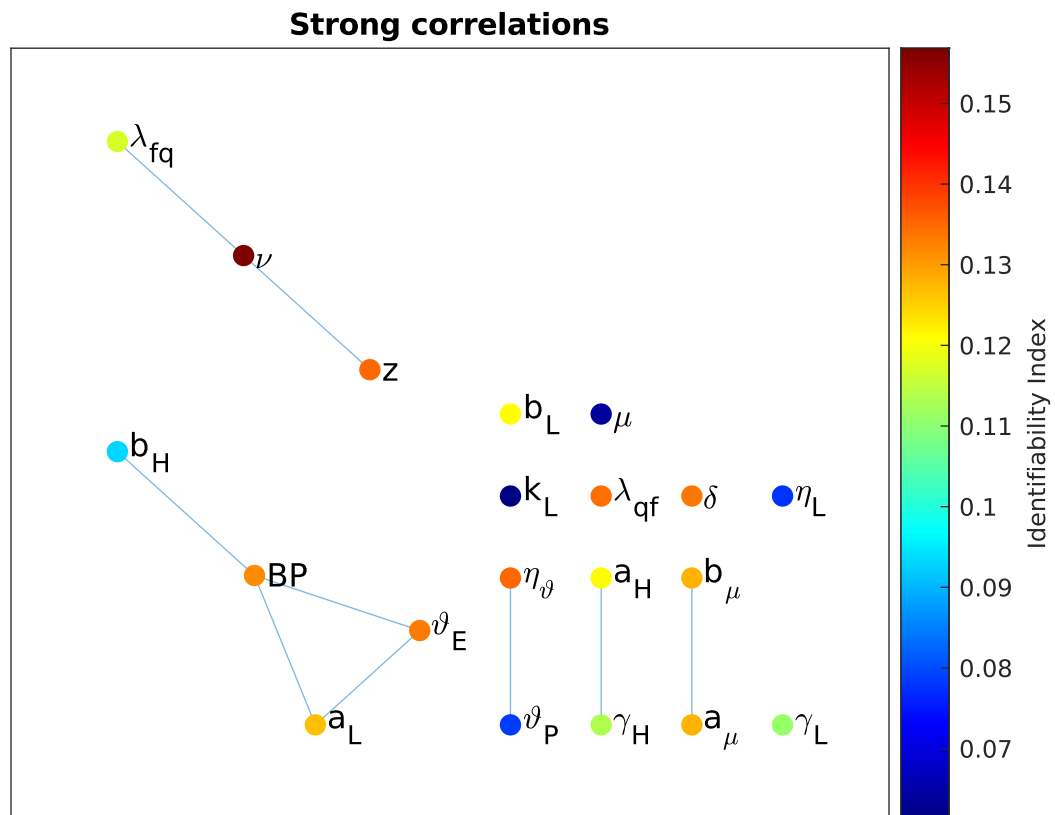
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0379'	'0.1135'	'0.0757'	'0'	'0.1172'
\vartheta_E	'0.3083'	'0.3682'	'0.3383'	'0.0001'	'0.133'
\gamma_L	'0.1961'	'0.2811'	'0.2386'	'0.1657'	'0.1112'
k_L	'5.274'	'5.6932'	'5.4836'	'5.3756'	'0.0614'
\lambda_{qf}	'0.6355'	'0.7351'	'0.6853'	'0.0552'	'0.1343'
\delta	'0.1008'	'0.1136'	'0.1072'	'0.15'	'0.1336'
\eta_L	'0.5988'	'0.6654'	'0.6321'	'0.1758'	'0.078'
\vartheta_P	'0.0255'	'0.0424'	'0.034'	'0.0003'	'0.0787'
\gamma_H	'0.6132'	'0.675'	'0.6441'	'0.9992'	'0.1133'
z	'18.2425'	'20.8329'	'19.5377'	'29.994'	'0.1349'
\eta_{\vartheta}	'0.6589'	'0.7453'	'0.7021'	'0.1407'	'0.135'
a_L	'4.7489'	'5.5542'	'5.1516'	'6.5066'	'0.1268'
b_L	'9.5827'	'10.7075'	'10.1451'	'14.9944'	'0.1208'
a_{\mu}	'9.0977'	'10.4177'	'9.7577'	'4.6047'	'0.1278'
b_{\mu}	'4.7079'	'6.1132'	'5.4106'	'13.9633'	'0.1278'
\mu	'0.0059'	'0.0281'	'0.017'	'0.0163'	'0.064'
a_H	'10.6979'	'11.6281'	'11.163'	'14.9832'	'0.1214'
b_H	'1.6641'	'2.0233'	'1.8437'	'2.0351'	'0.0934'
\nu	'262.0296'	'309.5309'	'285.7802'	'499.9832'	'0.1568'
BP	'333.9483'	'335.0517'	'334.5'	'334.4999'	'0.1317'

### 10.3. Identifiability analysis

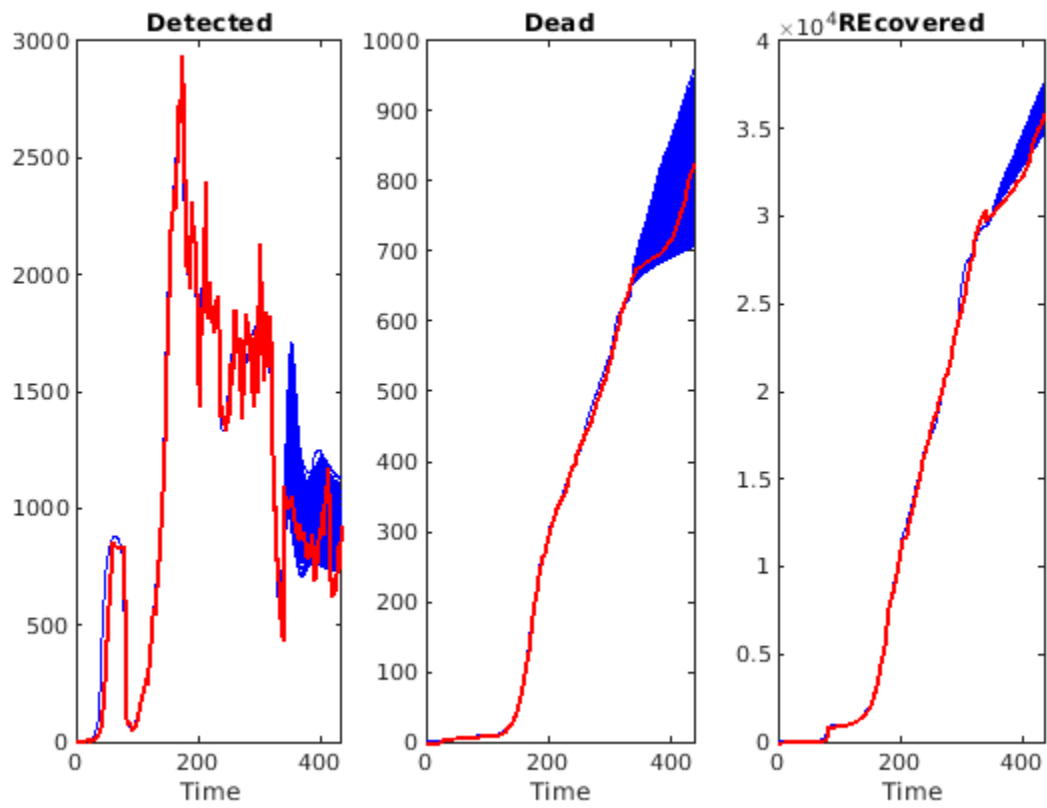






## 10.4. Uncertainty analysis

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 data437 to the 458. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

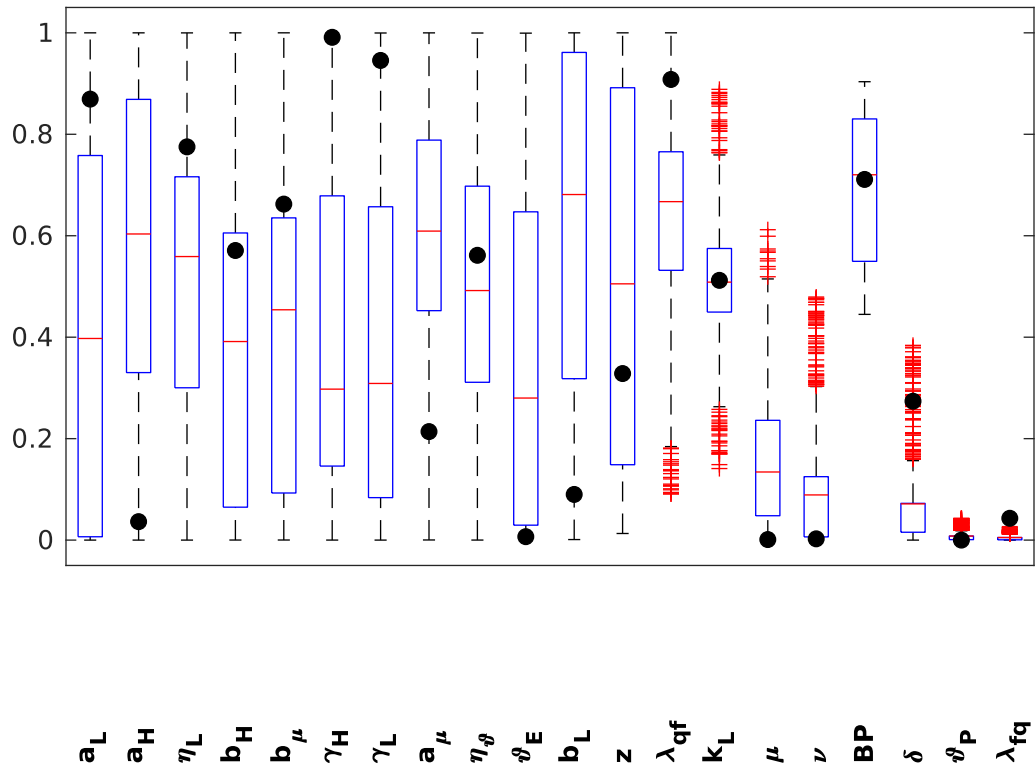
### 11.2. Estimated parameters with their intervals

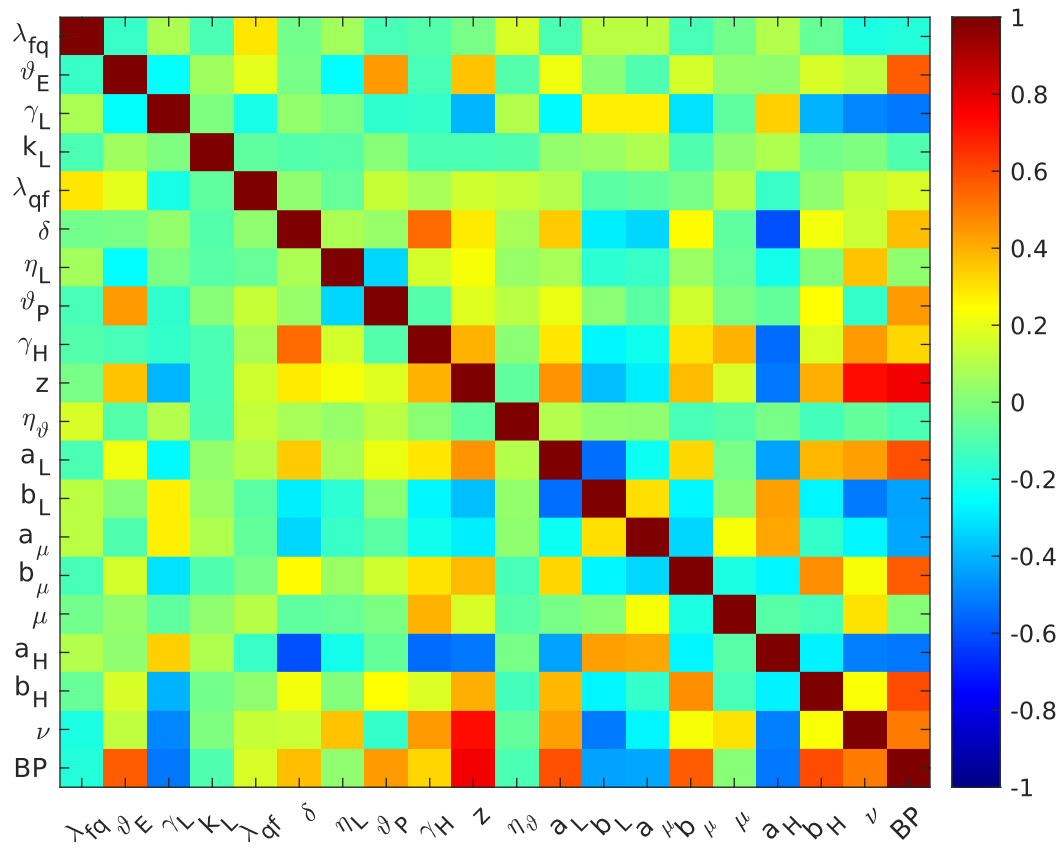
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

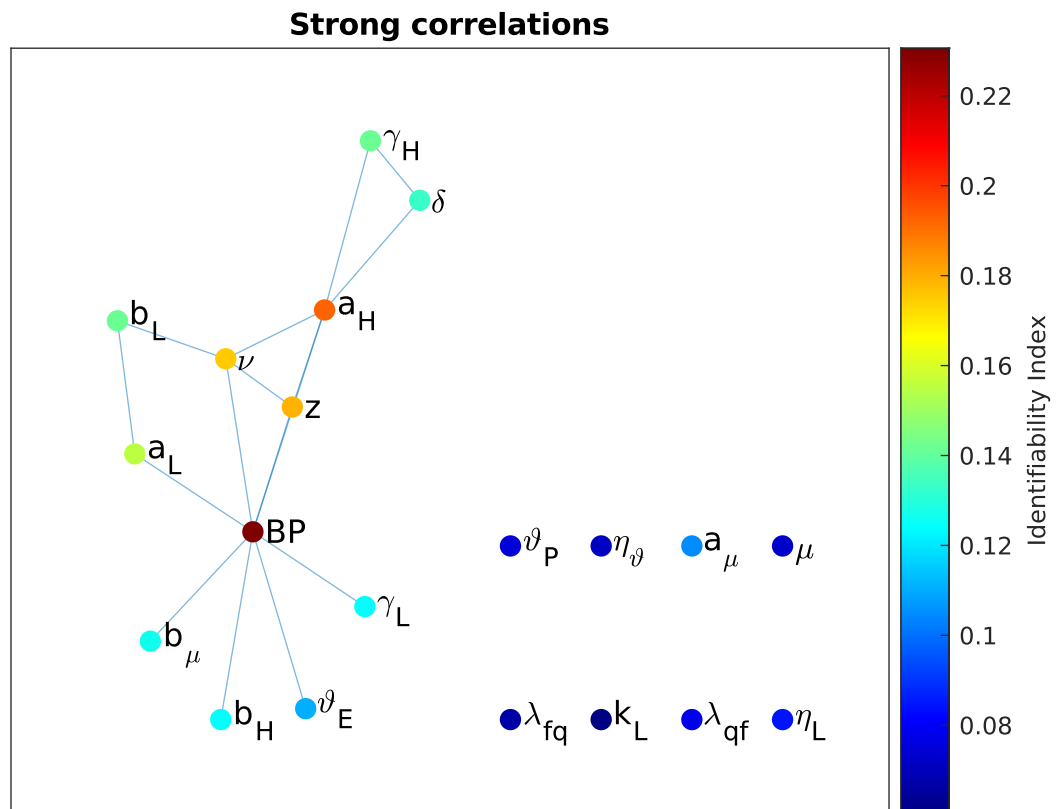
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0019'	'0.0921'	'0.0051'	'0.043'	'0.0669'
$\vartheta_E$	'0.0057'	'0.0115'	'0.28'	'0.0068'	'0.1108'
$\gamma_L$	'0.1'	'1'	'0.3088'	'0.9456'	'0.1246'
$k_L$	'1'	'10'	'5.5769'	'5.6085'	'0.0607'
$\lambda_{qf}$	'0.1999'	'1'	'0.6672'	'0.9081'	'0.0779'
$\delta$	'0.0193'	'0.0425'	'0.0107'	'0.0411'	'0.1332'
$\eta_L$	'0.2793'	'1'	'0.559'	'0.7752'	'0.0848'
$\vartheta_P$	'0'	'0'	'0.008'	'0'	'0.0748'
$\gamma_H$	'0.4725'	'1'	'0.2976'	'0.9912'	'0.1422'
$z$	'9.6811'	'22.9'	'15.1551'	'9.8496'	'0.179'
$\eta_{\vartheta}$	'0.5586'	'0.6411'	'0.4919'	'0.5614'	'0.0719'
$a_L$	'8.9572'	'15'	'6.5645'	'13.1705'	'0.1552'
$b_L$	'1.1263'	'6.05'	'10.5372'	'2.2602'	'0.1421'
$a_{\mu}$	'1'	'14.3'	'9.5281'	'3.9948'	'0.1045'
$b_{\mu}$	'1.6913'	'15'	'7.3564'	'10.2731'	'0.1269'
$\mu$	'0.0001'	'0.0022'	'0.1343'	'0.0011'	'0.0732'
$a_H$	'1'	'2.3975'	'9.4486'	'1.5094'	'0.1922'
$b_H$	'3.7026'	'15'	'6.4801'	'8.9928'	'0.1247'
$\nu$	'0.8537'	'2.8197'	'44.5236'	'1.2532'	'0.175'
BP	'416.1308'	'422.4337'	'417.5'	'416.4992'	'0.2306'

### 11.3. Identifiability analysis



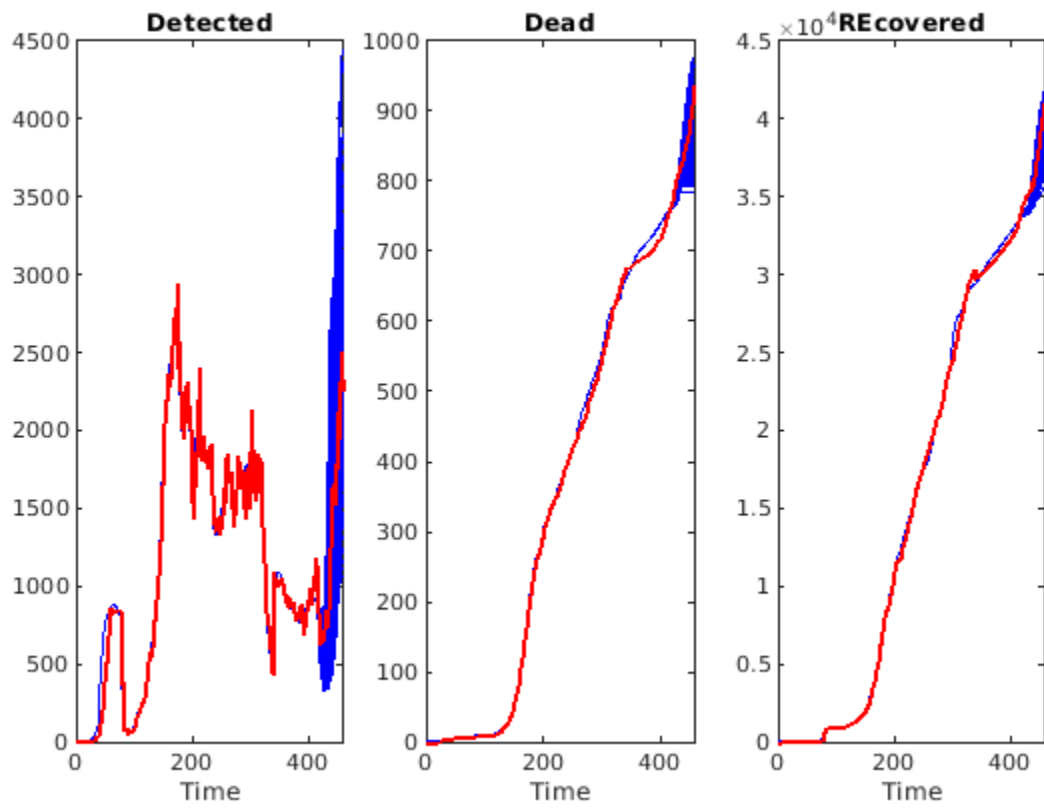






## 11.4. Uncertainty analysis

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 data458 to the 470. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

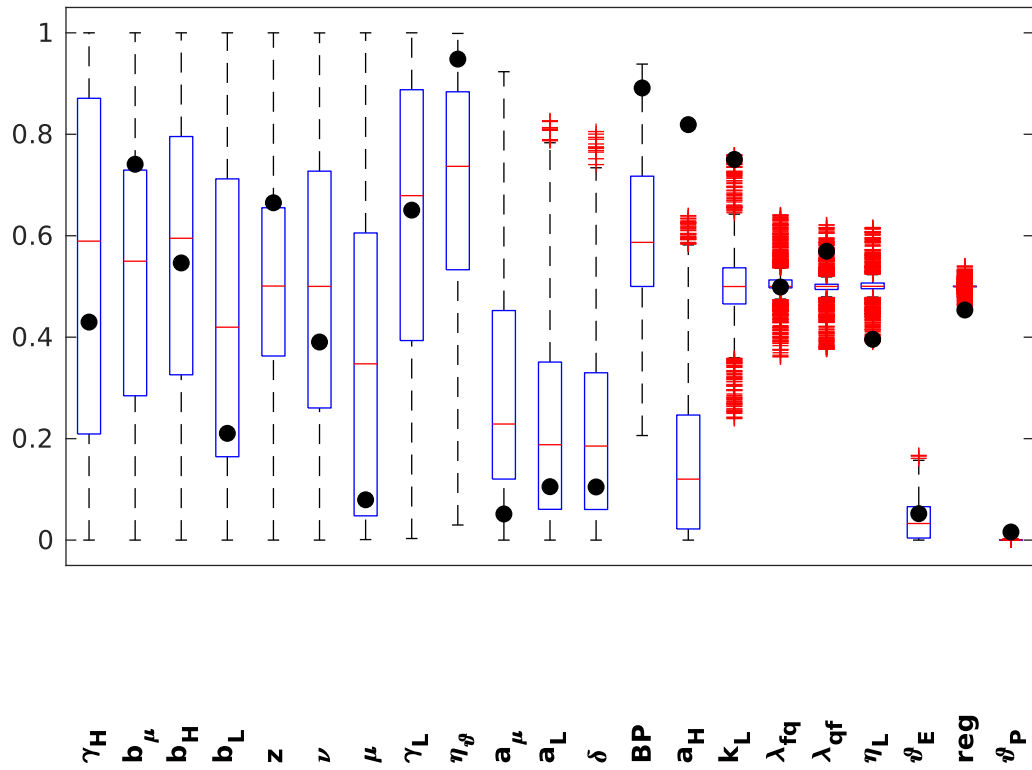
### 12.2. Estimated parameters with their intervals

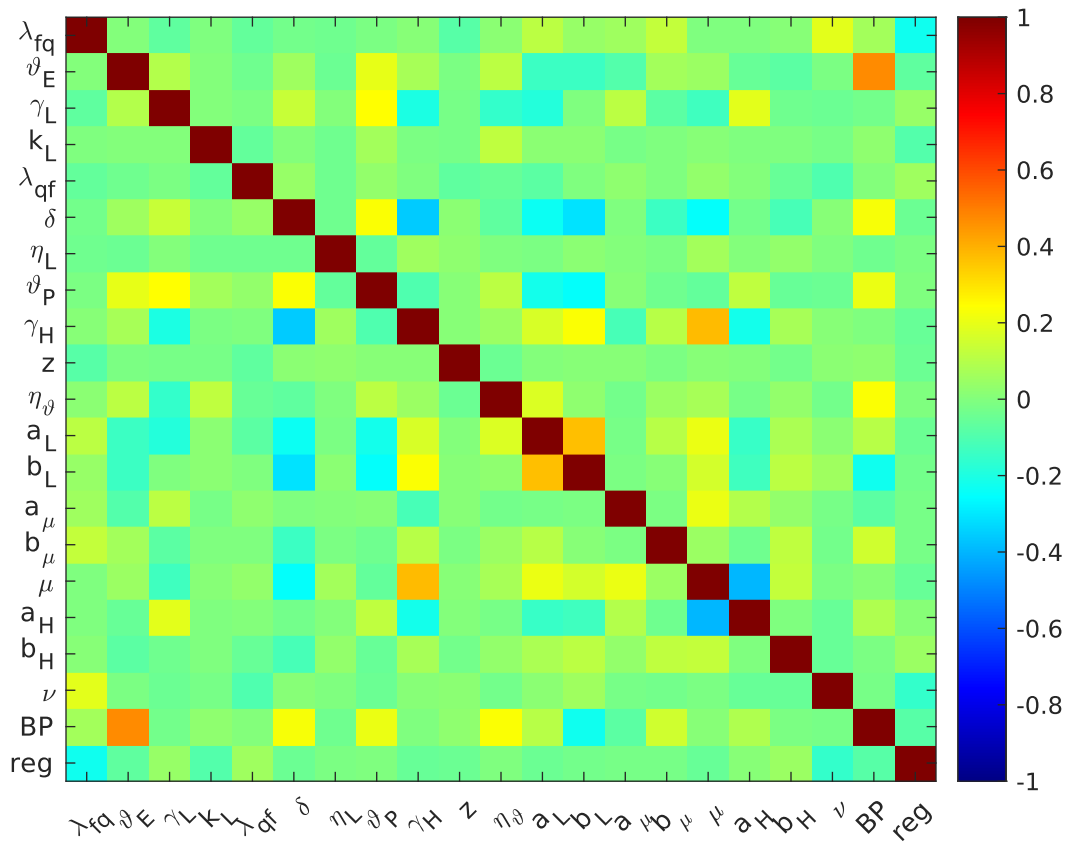
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

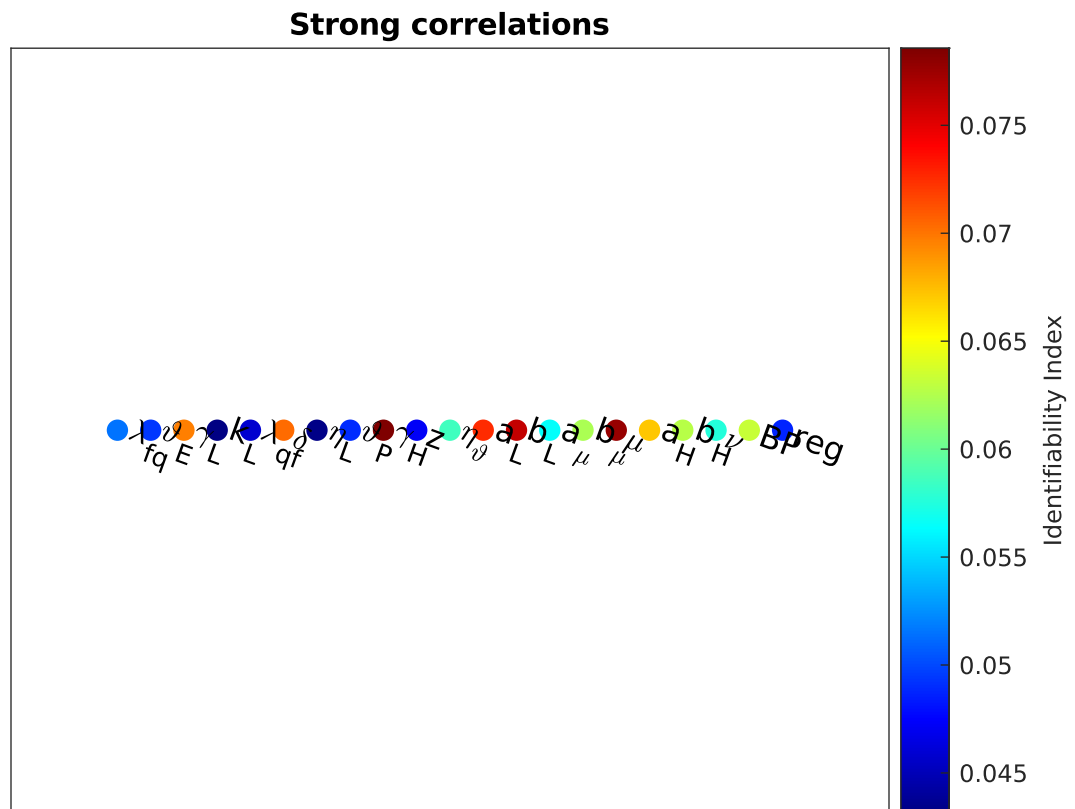
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.025'	'1'	'0.5'	'0.4988'	'0.0516'
\vartheta_E	'0.0304'	'0.1129'	'0.0327'	'0.0521'	'0.0494'
\gamma_L	'0.5948'	'0.8864'	'0.679'	'0.6505'	'0.0697'
k_L	'1'	'9.1225'	'5.4989'	'7.7537'	'0.0432'
\lambda_{qf}	'0'	'0.95'	'0.5'	'0.5695'	'0.0458'
\delta	'0.0009'	'0.0354'	'0.0278'	'0.0157'	'0.0703'
\eta_L	'0'	'0.8907'	'0.5002'	'0.3959'	'0.0434'
\vartheta_P	'0.0103'	'0.022'	'0.0003'	'0.0159'	'0.049'
\gamma_H	'0'	'0.967'	'0.5894'	'0.4298'	'0.0786'
z	'0'	'28.5'	'15.0244'	'19.949'	'0.0473'
\eta_{\vartheta}	'0.8027'	'1'	'0.7368'	'0.9482'	'0.0585'
a_L	'1.9158'	'2.5422'	'3.6321'	'2.474'	'0.0726'
b_L	'1.8807'	'4.0909'	'6.8759'	'3.9463'	'0.0761'
a_{\mu}	'1.35'	'15'	'4.2036'	'1.7209'	'0.0565'
b_{\mu}	'1'	'15'	'8.6973'	'11.3729'	'0.0623'
\mu	'0'	'0.1788'	'0.3475'	'0.0795'	'0.0777'
a_H	'3.8982'	'15'	'2.6827'	'12.4663'	'0.0672'
b_H	'1'	'14.3'	'9.3307'	'8.6491'	'0.0627'
\nu	'26.8945'	'500'	'250.0673'	'195.2334'	'0.0576'
BP	'452.4917'	'460'	'450.5'	'457.5'	'0.0633'
reg	'0.0063'	'0.25'	'0.125'	'0.1134'	'0.0487'

### 12.3. Identifiability analysis

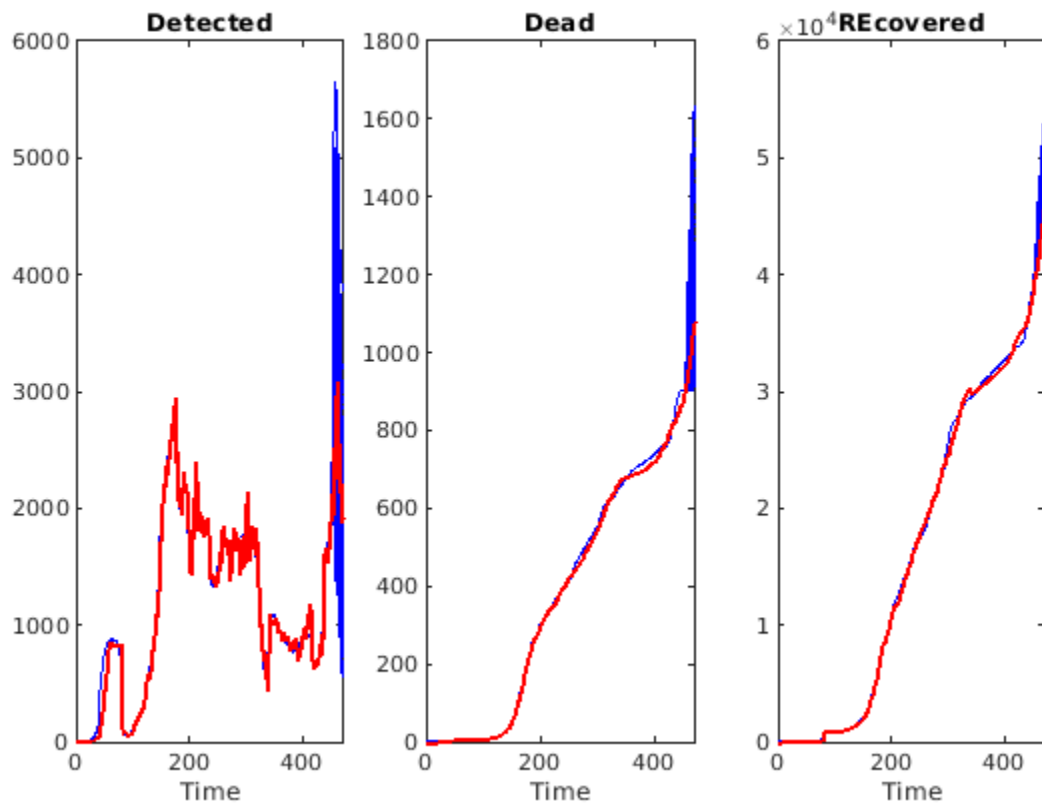






## 12.4. Uncertainty analysis

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 data470 to the 479. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

### 13.2. Estimated parameters with their intervals

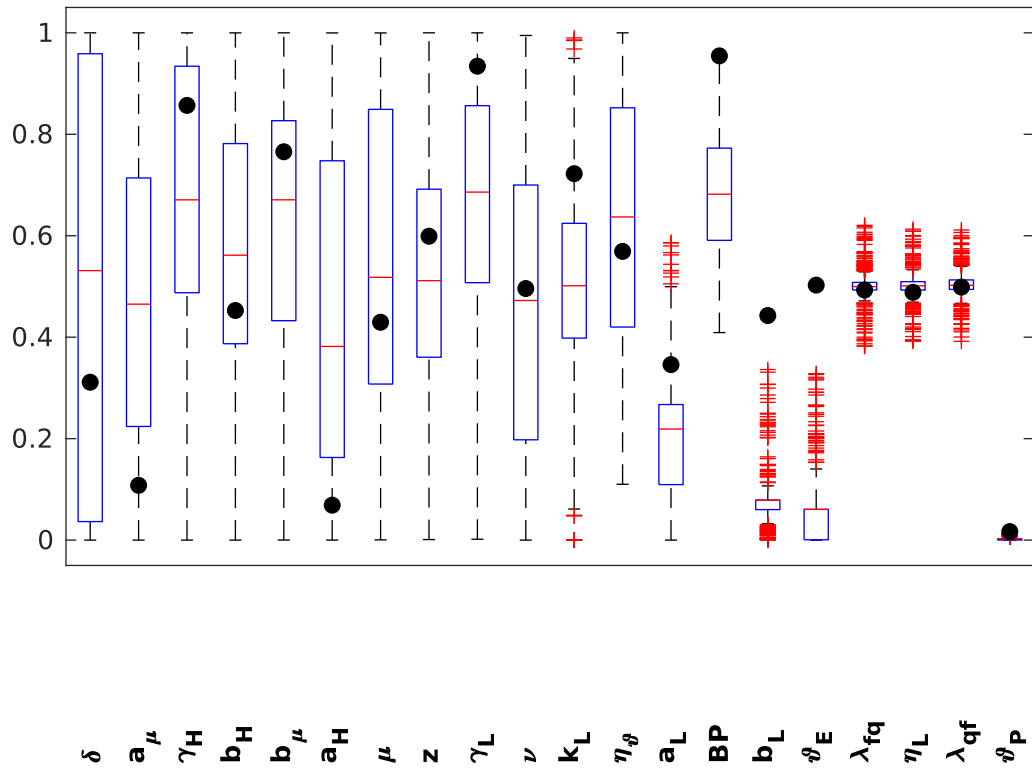
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

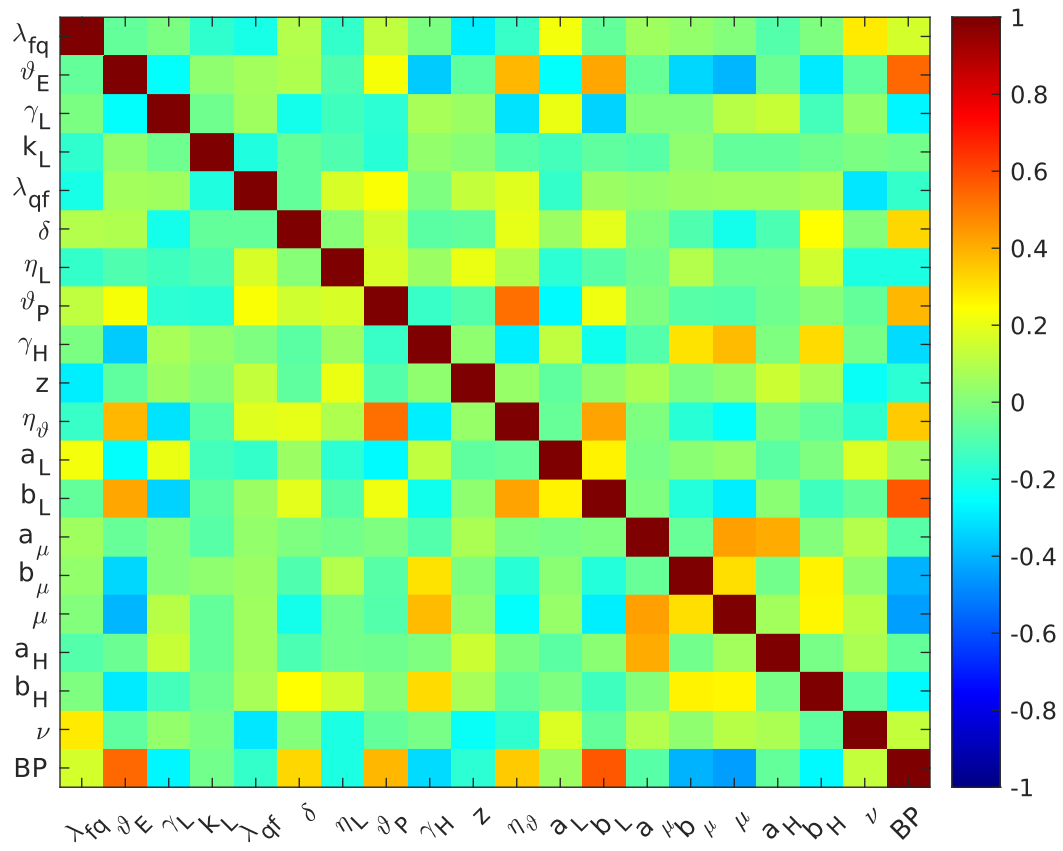
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.025'	'0.9236'	'0.4997'	'0.493'	'0.0748'
$\vartheta_E$	'0.4522'	'0.9657'	'0.0606'	'0.5027'	'0.1301'
$\gamma_L$	'0.3221'	'0.9724'	'0.686'	'0.9342'	'0.0909'
$k_L$	'1'	'10'	'5.5128'	'7.5009'	'0.0683'
$\lambda_{qf}$	'0'	'1'	'0.5022'	'0.4988'	'0.0742'
$\delta$	'0'	'0.105'	'0.0797'	'0.0467'	'0.1056'
$\eta_L$	'0'	'1'	'0.5012'	'0.4885'	'0.0728'
$\vartheta_P$	'0.0059'	'0.0361'	'0.0025'	'0.0168'	'0.0801'
$\gamma_H$	'0'	'1'	'0.6708'	'0.857'	'0.0987'
$z$	'0'	'30'	'15.3434'	'17.9702'	'0.08'
$\eta_{\vartheta}$	'0.5658'	'0.867'	'0.637'	'0.5691'	'0.1169'
$a_L$	'4.2074'	'6.9395'	'4.0653'	'5.8433'	'0.0773'
$b_L$	'6.7936'	'14.2272'	'2.1038'	'7.1979'	'0.1249'
$a_{\mu}$	'1'	'15'	'7.5113'	'2.5119'	'0.0858'
$b_{\mu}$	'1'	'15'	'10.3916'	'11.7172'	'0.0928'
$\mu$	'0.0193'	'0.8919'	'0.518'	'0.4294'	'0.1112'
$a_H$	'1'	'14.3'	'6.3449'	'1.9639'	'0.0876'
$b_H$	'1.7'	'14.468'	'8.863'	'7.337'	'0.091'
$\nu$	'13.4343'	'461.3938'	'236.1694'	'247.9534'	'0.0916'
BP	'467.493'	'469'	'465.5'	'468.5'	'0.1295'



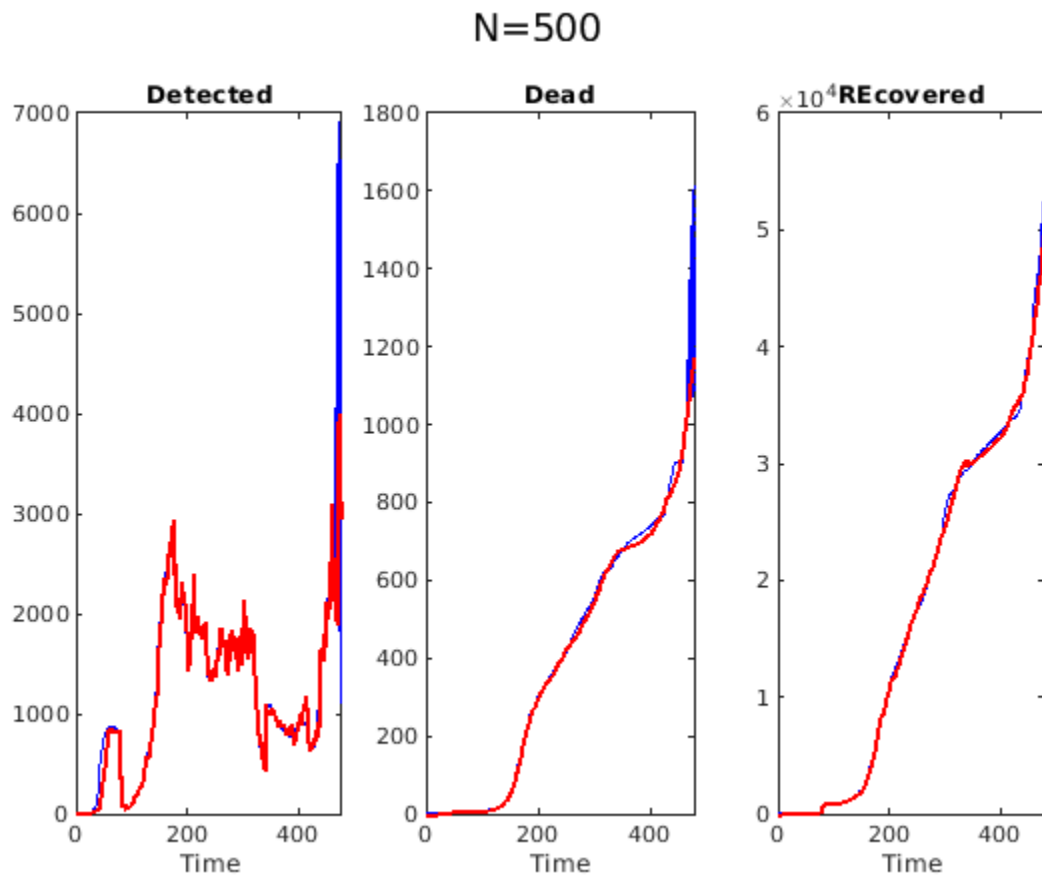
### 13.3. Identifiability analysis







### 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 data479 to the 501. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

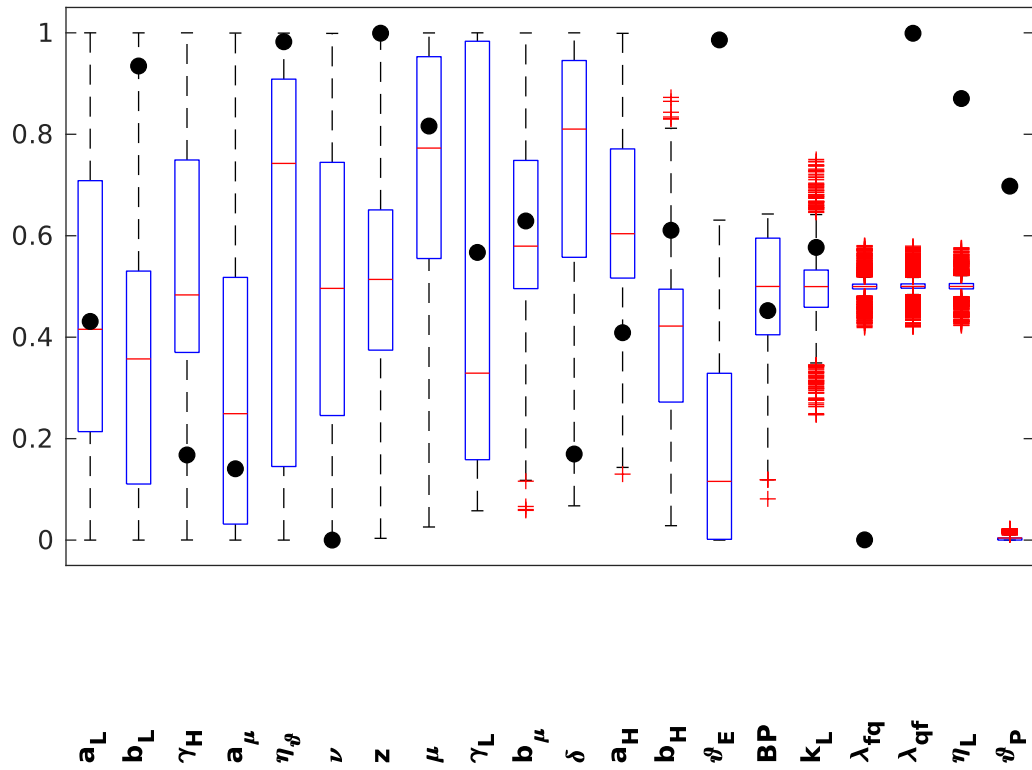
### 14.2. Estimated parameters with their intervals

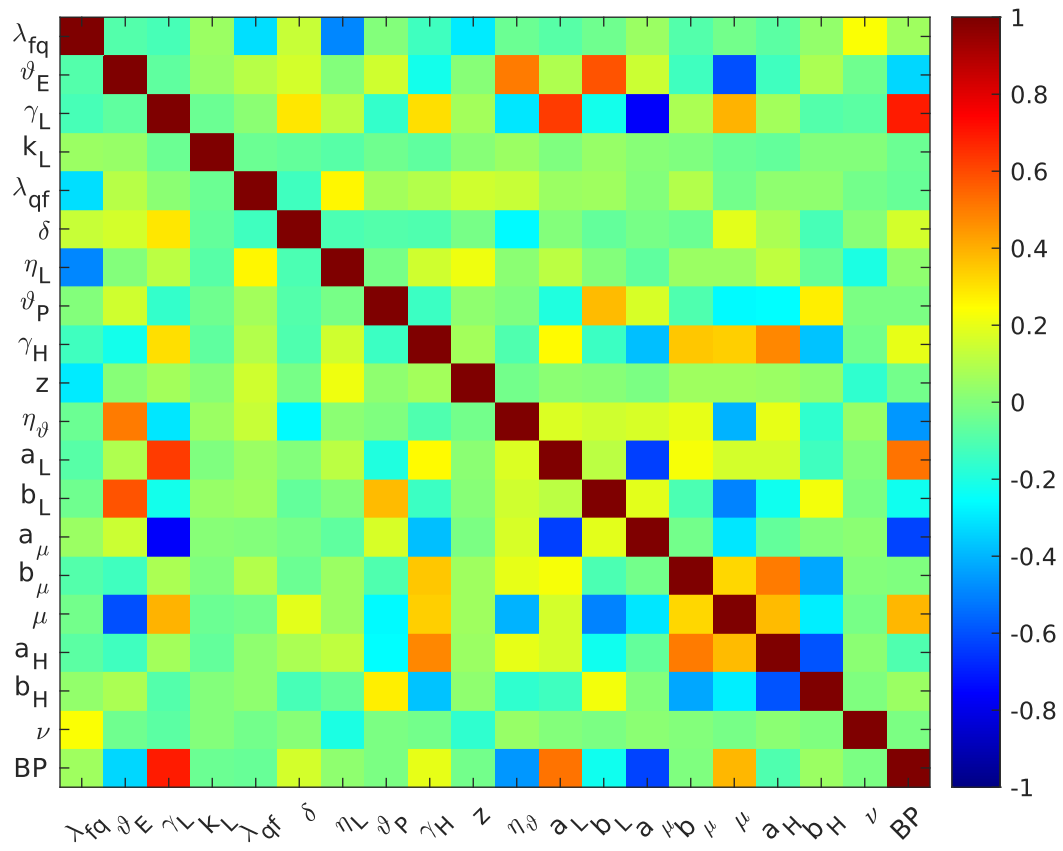
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

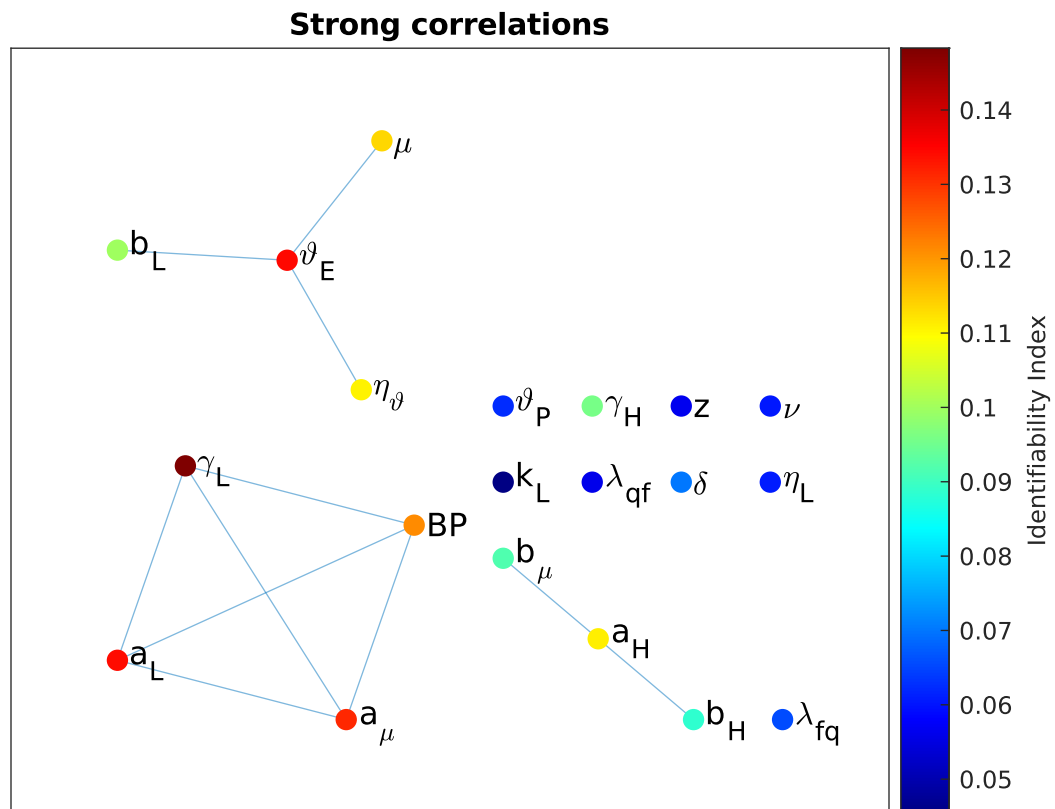
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0009'	'0.4998'	'0.0005'	'0.0657'
$\vartheta_E$	'0.8366'	'0.9918'	'0.1164'	'0.986'	'0.1343'
$\gamma_L$	'0.485'	'0.5727'	'0.3291'	'0.5671'	'0.1483'
$k_L$	'1.18'	'9.559'	'5.4977'	'6.193'	'0.0456'
$\lambda_{qf}$	'0.5111'	'1'	'0.5'	'0.9991'	'0.0561'
$\delta$	'0.0058'	'0.0528'	'0.1215'	'0.0255'	'0.0703'
$\eta_L$	'0.2889'	'1'	'0.5'	'0.8704'	'0.0608'
$\vartheta_P$	'0.5769'	'0.7114'	'0.0042'	'0.6978'	'0.0627'
$\gamma_H$	'0.0082'	'0.3272'	'0.4833'	'0.1679'	'0.0959'
$z$	'22.1419'	'30'	'15.4166'	'29.9778'	'0.0566'
$\eta_{\vartheta}$	'0.4565'	'1'	'0.7426'	'0.9824'	'0.1109'
$a_L$	'1.5764'	'8.1939'	'6.818'	'7.0354'	'0.1341'
$b_L$	'11.11'	'14.7677'	'6.0002'	'14.0844'	'0.1001'
$a_{\mu}$	'1.8905'	'15'	'4.4889'	'2.9686'	'0.1314'
$b_{\mu}$	'1'	'13.9024'	'9.1112'	'9.8071'	'0.0918'
$\mu$	'0.0238'	'0.8685'	'0.7728'	'0.8162'	'0.1136'
$a_H$	'1.7'	'14.468'	'9.4547'	'6.7237'	'0.1112'
$b_H$	'1.5212'	'10.8566'	'6.9074'	'9.5507'	'0.0886'
$\nu$	'0'	'0.0153'	'248.1064'	'0.0077'	'0.0605'
BP	'478.7068'	'479.5019'	'480.5'	'479.5'	'0.1213'

### 14.3. Identifiability analysis



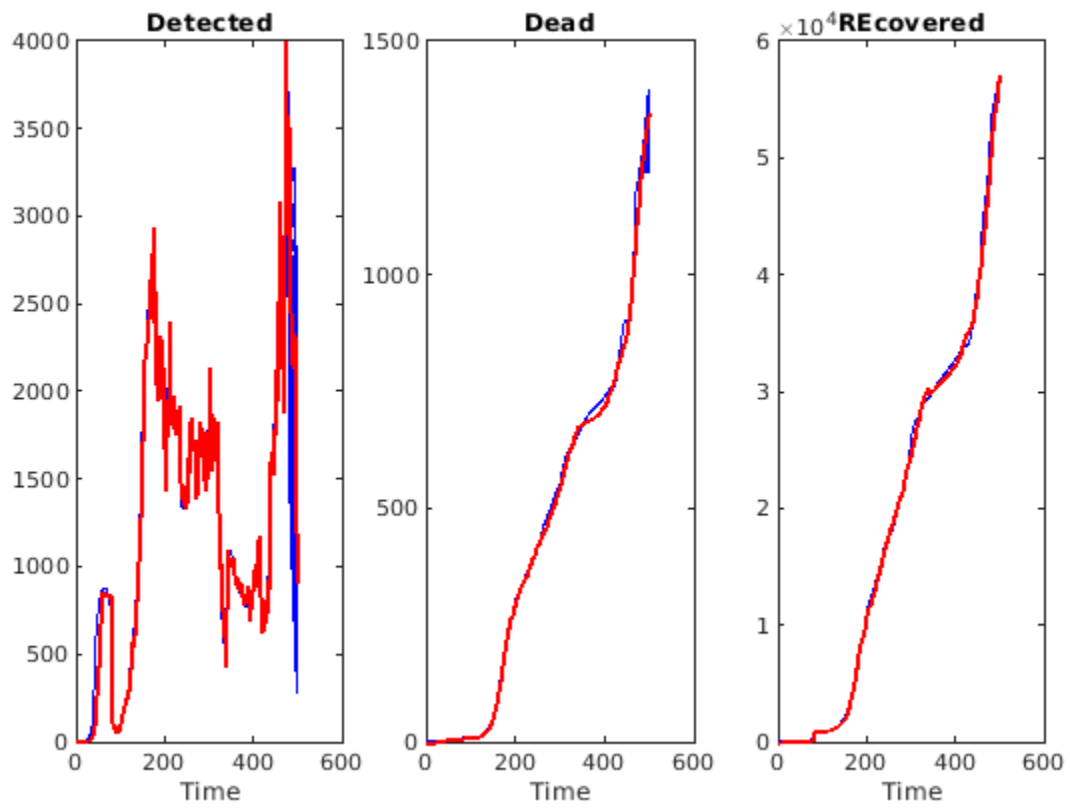






## 14.4. Uncertainty analysis

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 data501 to the 600. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was2000.

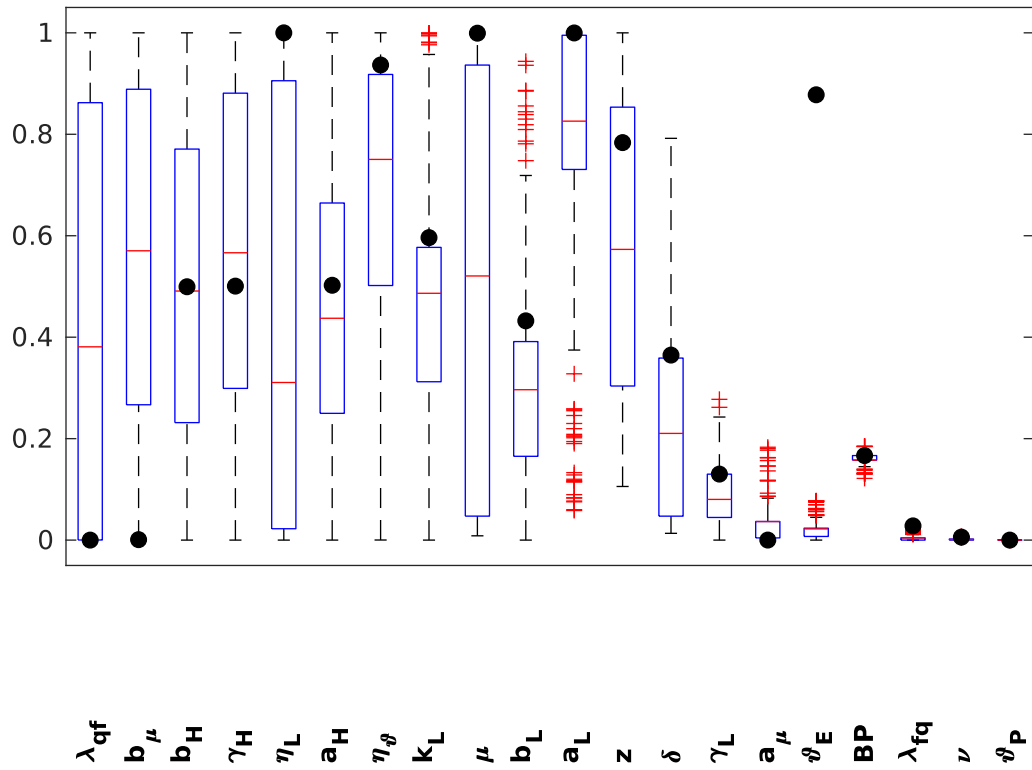
### 15.2. Estimated parameters with their intervals

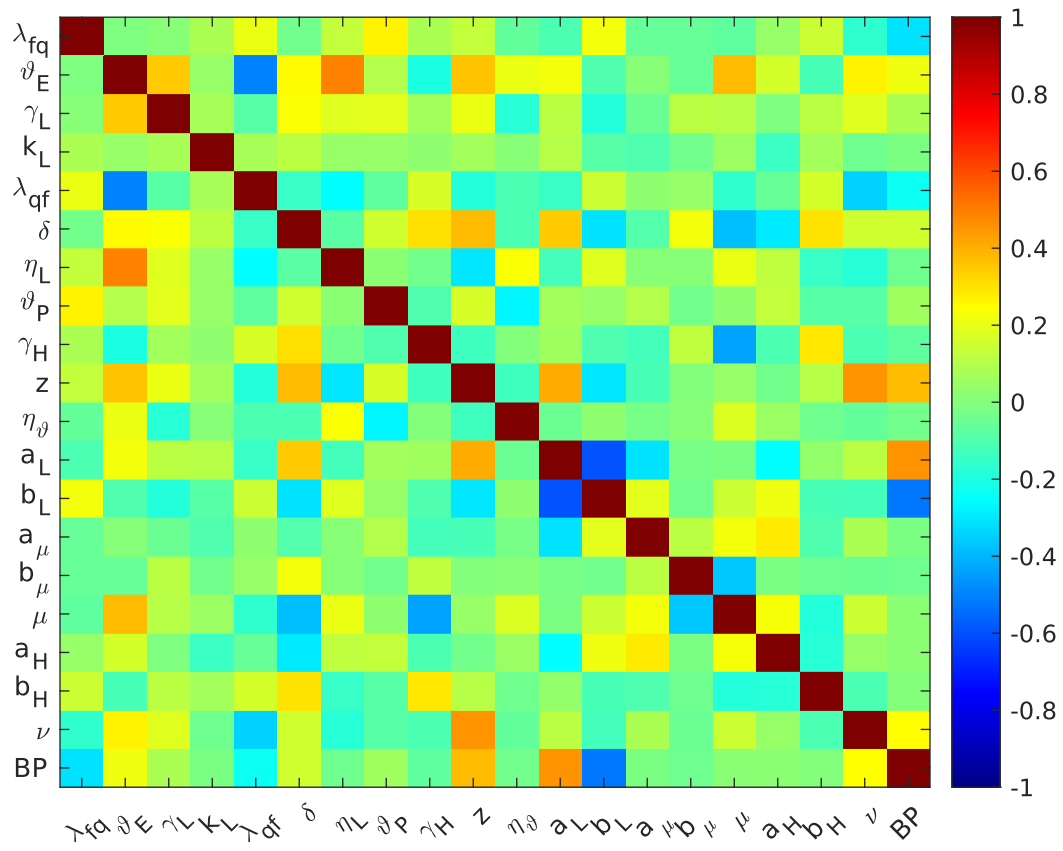
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

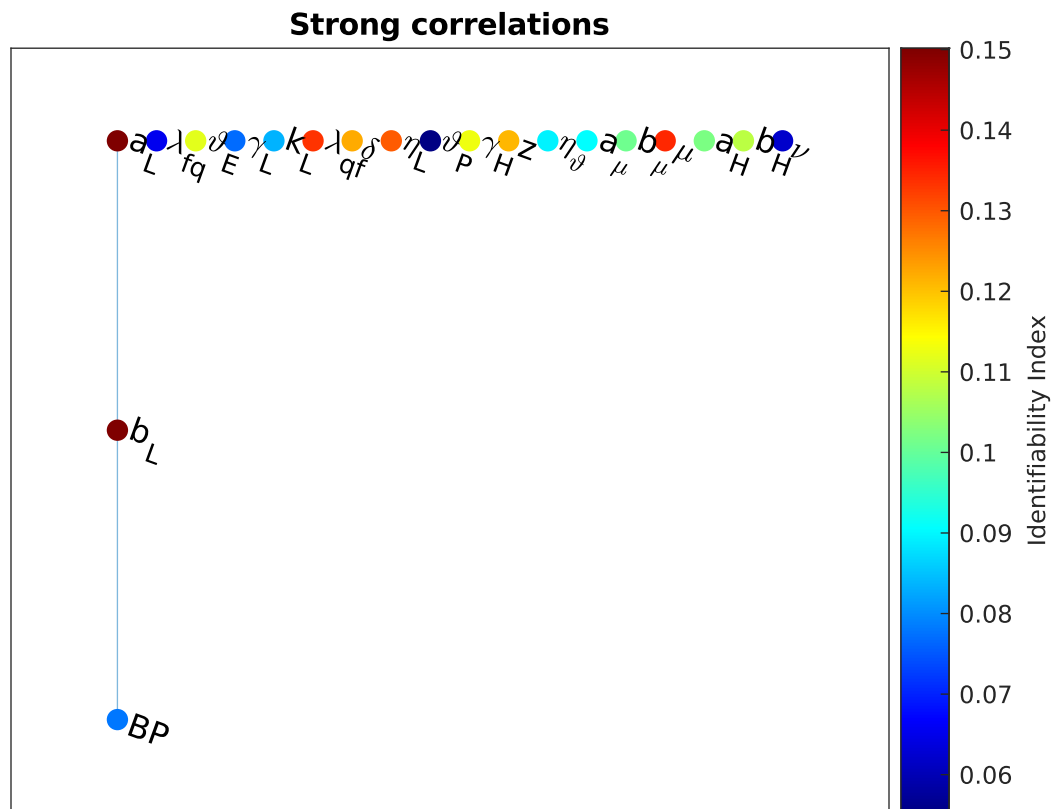
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0253'	'0.0308'	'0.0044'	'0.028'	'0.0657'
$\vartheta_E$	'0.8239'	'0.8803'	'0.022'	'0.8778'	'0.1117'
$\gamma_L$	'0.0329'	'0.1412'	'0.0802'	'0.1301'	'0.0772'
$k_L$	'1'	'9.64'	'5.3789'	'6.3665'	'0.0835'
$\lambda_{qf}$	'0'	'0'	'0.381'	'0'	'0.1334'
$\delta$	'0'	'0.1182'	'0.0315'	'0.0547'	'0.1221'
$\eta_L$	'0.7132'	'1'	'0.3107'	'1'	'0.1295'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0553'
$\gamma_H$	'0.0192'	'0.96'	'0.5665'	'0.5007'	'0.1128'
$z$	'20.9183'	'29.1145'	'17.1923'	'23.5078'	'0.1213'
$\eta_{\vartheta}$	'0.3055'	'1'	'0.7505'	'0.9366'	'0.0896'
$a_L$	'6.641'	'15'	'12.5624'	'14.9964'	'0.15'
$b_L$	'2.1793'	'12.3608'	'5.1505'	'7.0514'	'0.1502'
$a_{\mu}$	'1'	'15'	'1.5126'	'1.0012'	'0.0908'
$b_{\mu}$	'1'	'15'	'8.9847'	'1.0122'	'0.101'
$\mu$	'0'	'1'	'0.5207'	'0.9993'	'0.1343'
$a_H$	'1'	'14.44'	'7.1227'	'8.0331'	'0.1024'
$b_H$	'1'	'15'	'7.8741'	'7.9921'	'0.1083'
$\nu$	'2.3354'	'5.1232'	'0.6213'	'2.9304'	'0.0624'
BP	'495.6556'	'499.4573'	'496.5'	'497.5'	'0.0779'

### 15.3. Identifiability analysis

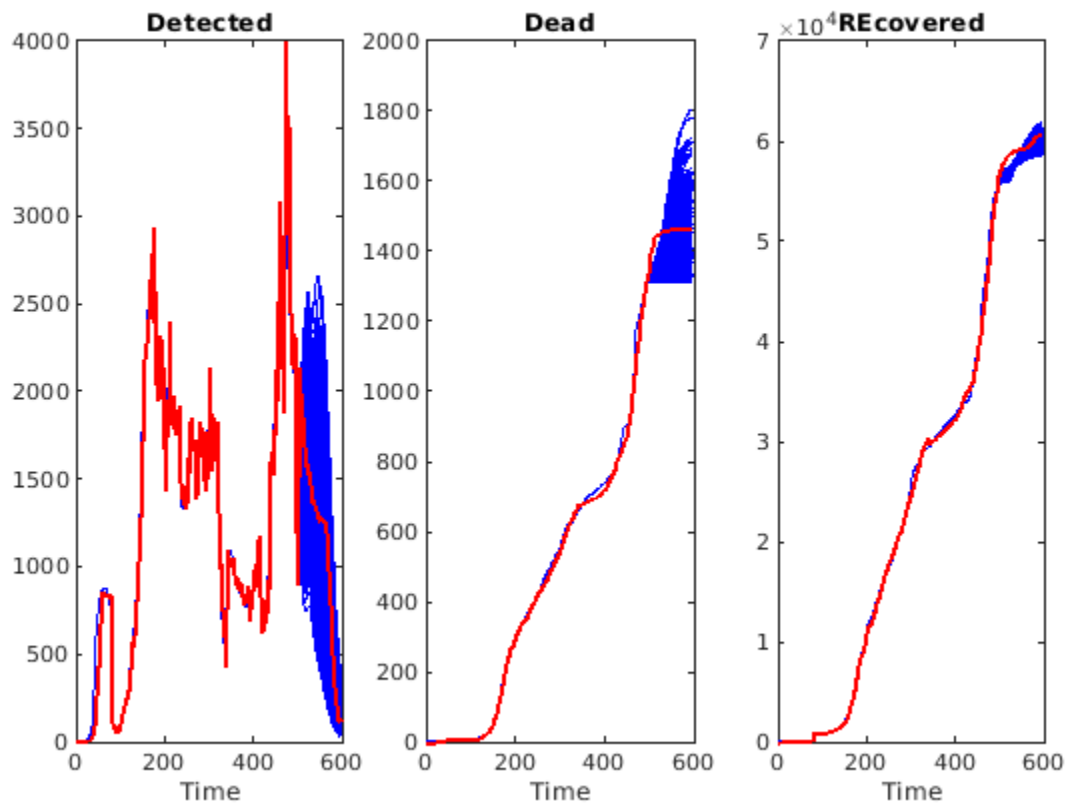






## 15.4. Uncertainty analysis

N=500



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## Chapter 16. Extension number16

### 16.1. Basic information

The extension to be validated consists of the time series from the data600 to the 721. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

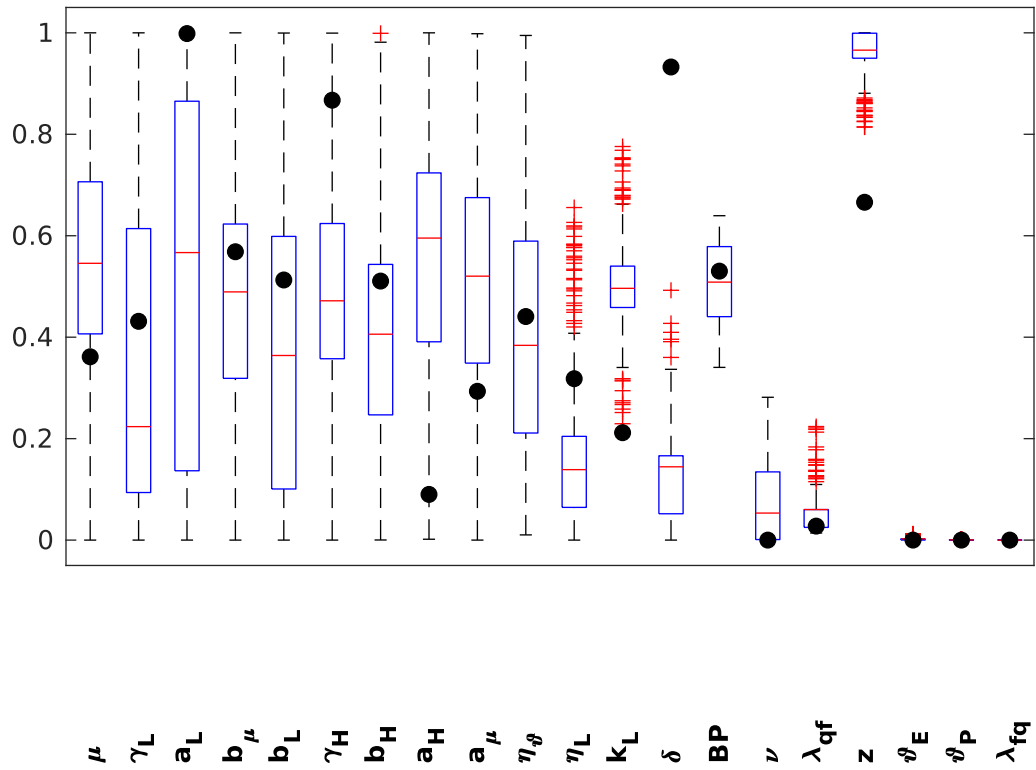
### 16.2. Estimated parameters with their intervals

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

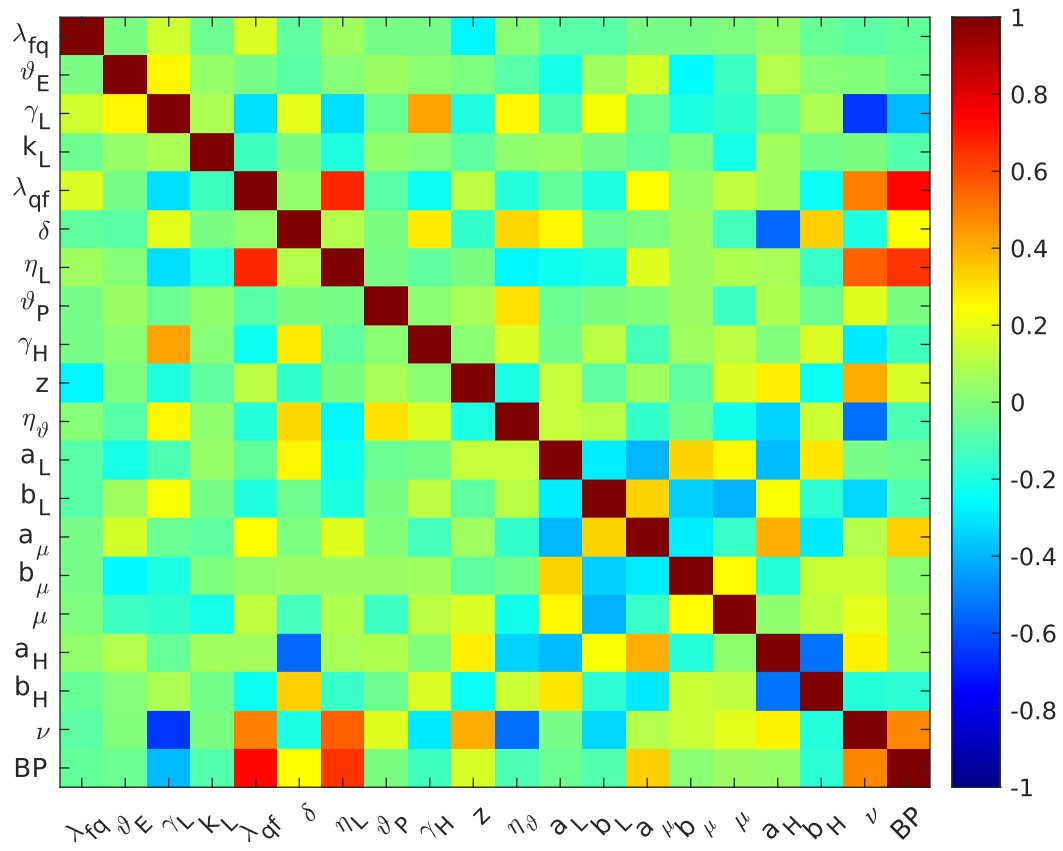
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

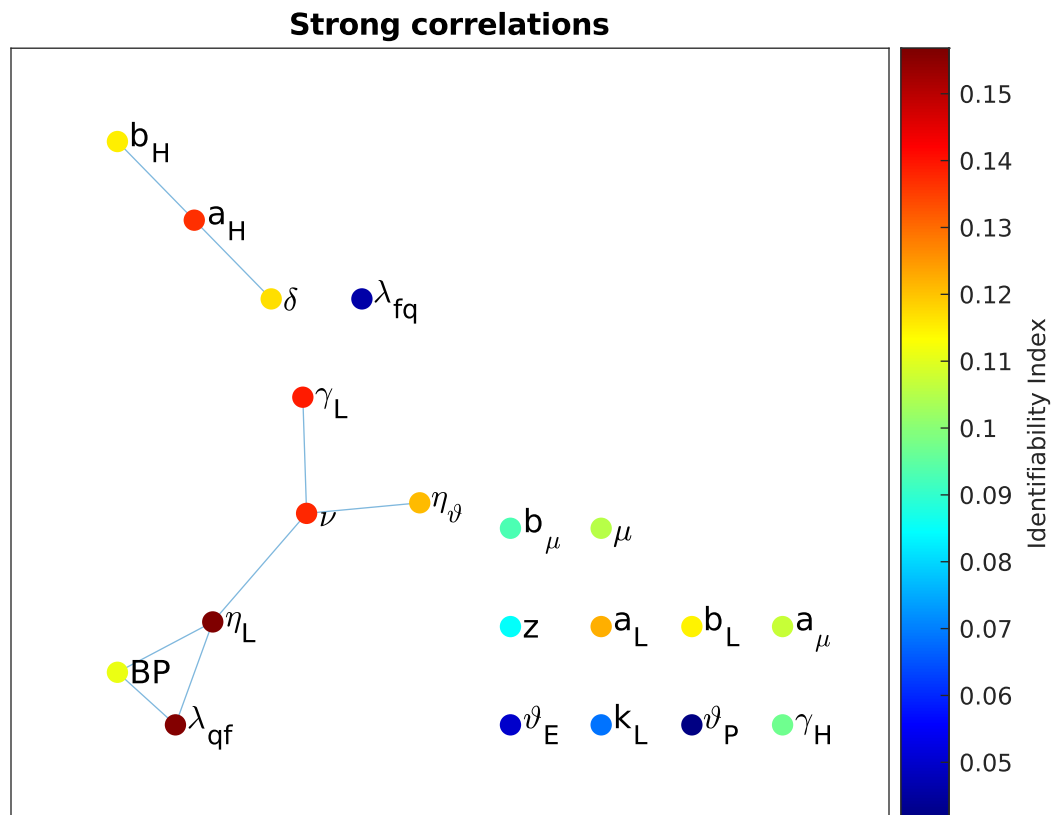
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0'	'0'	'0.0457'
$\vartheta_E$	'0'	'0.0001'	'0.0025'	'0'	'0.0502'
$\gamma_L$	'0.2428'	'0.9116'	'0.2237'	'0.4313'	'0.1391'
$k_L$	'1.5713'	'9.28'	'5.4669'	'2.9054'	'0.0691'
$\lambda_{qf}$	'0.0235'	'0.0352'	'0.0602'	'0.0276'	'0.1563'
$\delta$	'0.0714'	'0.1406'	'0.0217'	'0.1399'	'0.117'
$\eta_L$	'0.2768'	'1'	'0.1389'	'0.3182'	'0.1568'
$\vartheta_P$	'0'	'0'	'0.0004'	'0'	'0.0416'
$\gamma_H$	'0.3977'	'0.906'	'0.4717'	'0.8672'	'0.0971'
$z$	'19.0555'	'26.3147'	'28.9758'	'19.9795'	'0.0852'
$\eta_{\vartheta}$	'0.4233'	'0.4628'	'0.3839'	'0.4407'	'0.1211'
$a_L$	'10.144'	'15'	'8.9351'	'14.9794'	'0.1225'
$b_L$	'5.1082'	'8.6194'	'6.0948'	'8.1789'	'0.1145'
$a_{\mu}$	'4.9458'	'15'	'8.2842'	'5.107'	'0.1071'
$b_{\mu}$	'2.3629'	'12.4464'	'7.8501'	'8.9582'	'0.0933'
$\mu$	'0.0203'	'0.8131'	'0.5457'	'0.3614'	'0.1053'
$a_H$	'1.2285'	'2.646'	'9.3354'	'2.261'	'0.137'
$b_H$	'4.5778'	'13.2066'	'6.6827'	'8.1489'	'0.1151'
$\nu$	'0'	'0.0003'	'26.6381'	'0.0001'	'0.1378'
BP	'612.0996'	'616.2424'	'607.8011'	'612.3458'	'0.111'

### 16.3. Identifiability analysis









## 16.4. Uncertainty analysis

