

# **Validation process for QUIBDO**

**The epidemiology research group, EAFIT**

06-Apr-2022

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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 46. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

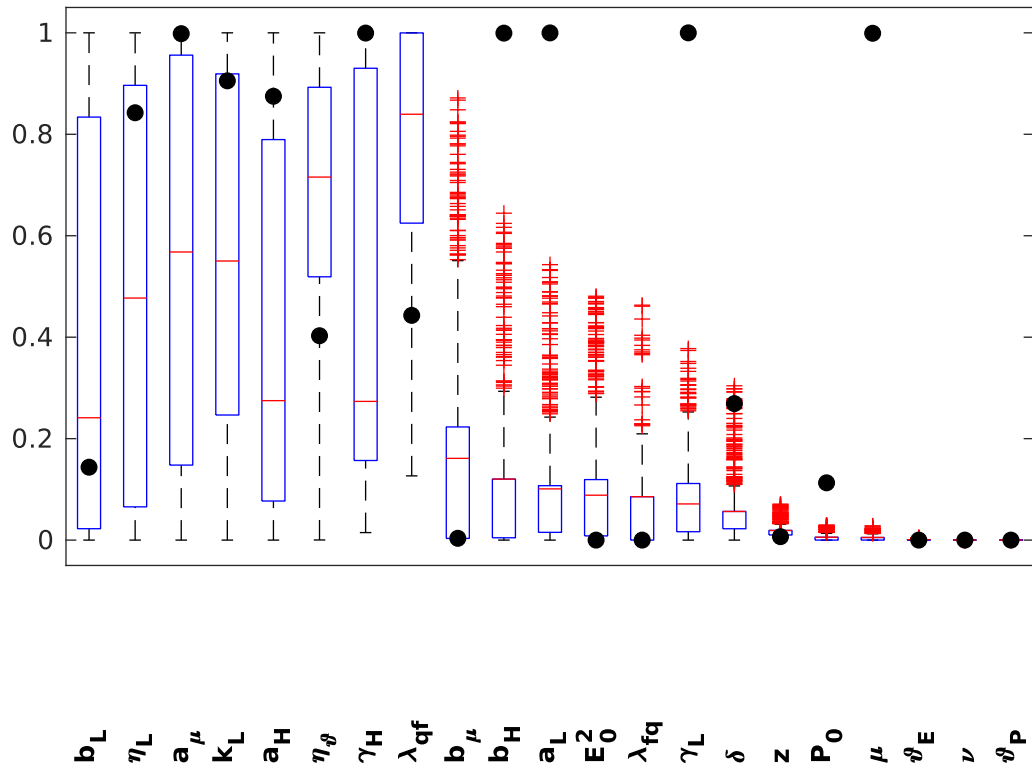
### 1.2. Estimated parameters with their intervals

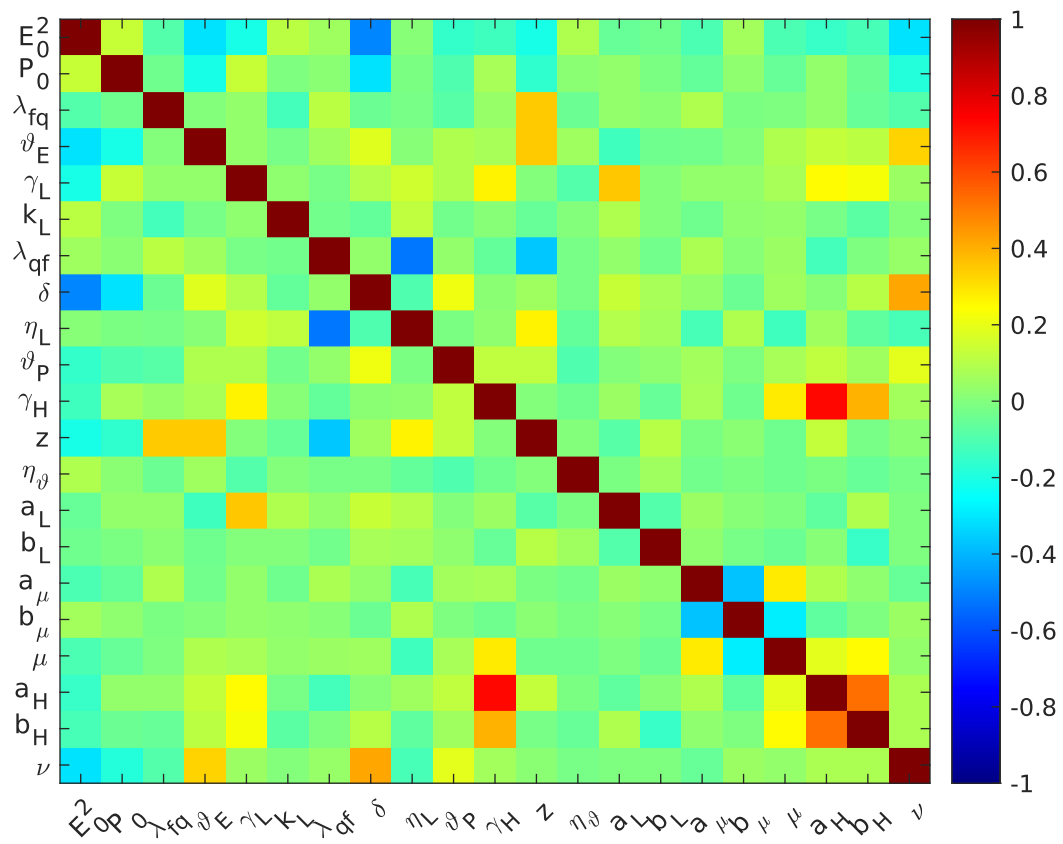
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

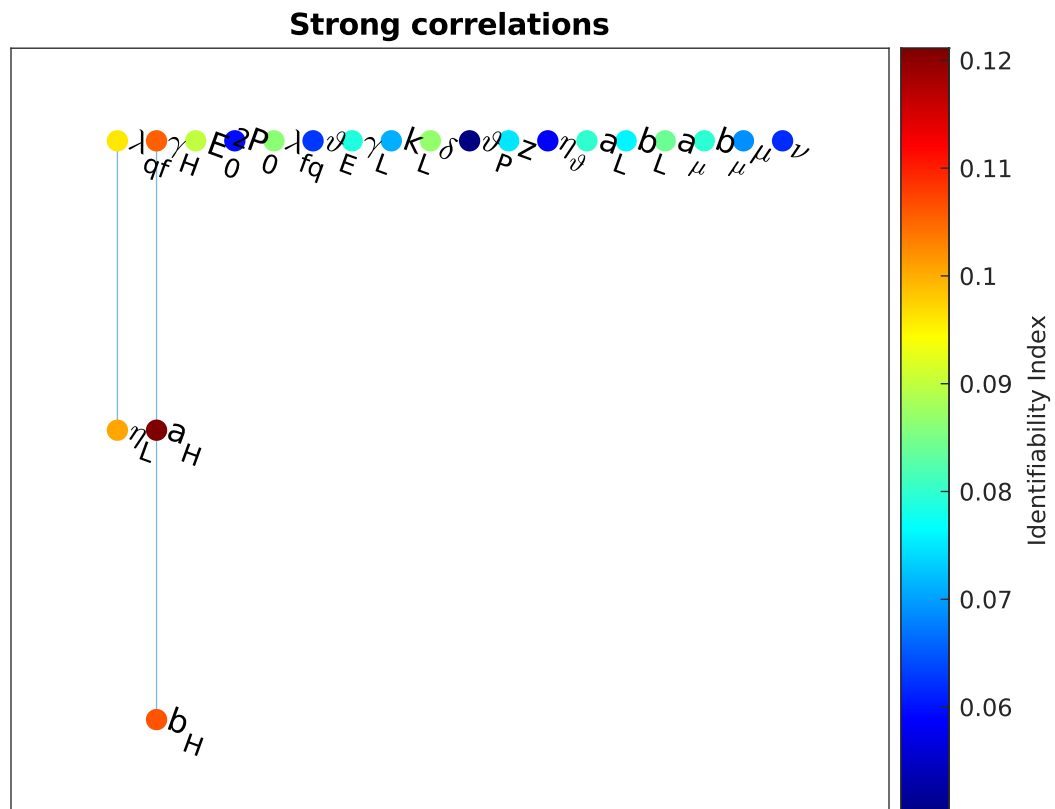
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
E^2_0	'0'	'0.0037'	'177.0293'	'0.0018'	'0.09'
P_0	'37.0905'	'46.1125'	'2.248'	'45.1666'	'0.0599'
\lambda_{fq}	'0'	'0'	'0.0856'	'0'	'0.0865'
\vartheta_E	'0'	'0'	'0.0009'	'0'	'0.0628'
\gamma_L	'0.197'	'1'	'0.0713'	'1'	'0.0789'
k_L	'1'	'10'	'5.9517'	'9.1482'	'0.0711'
\lambda_{qf}	'0.0638'	'0.9502'	'0.8395'	'0.443'	'0.096'
\delta	'0.0348'	'0.0459'	'0.0085'	'0.0404'	'0.0869'
\eta_L	'0.4166'	'0.9708'	'0.4771'	'0.8425'	'0.1006'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0502'
\gamma_H	'0.9135'	'1'	'0.2734'	'0.9995'	'0.1056'
z	'0.1787'	'0.2141'	'0.5718'	'0.203'	'0.075'
\eta_{\vartheta}	'0.3914'	'0.4281'	'0.7156'	'0.4029'	'0.059'
a_L	'9.9343'	'15'	'2.4133'	'14.9979'	'0.0799'
b_L	'1.5901'	'3.8772'	'4.3766'	'3.0121'	'0.0761'
a_{\mu}	'14.7385'	'15'	'8.9518'	'14.977'	'0.0843'
b_{\mu}	'1.0036'	'1.0903'	'3.256'	'1.0496'	'0.0799'
\mu	'0.8372'	'1'	'0.0052'	'0.9991'	'0.0689'
a_H	'12.8699'	'13.2706'	'4.8489'	'13.2494'	'0.1211'
b_H	'14.4573'	'15'	'2.6839'	'14.9916'	'0.1064'
\nu	'0.0003'	'0.0113'	'0.0029'	'0.0055'	'0.062'

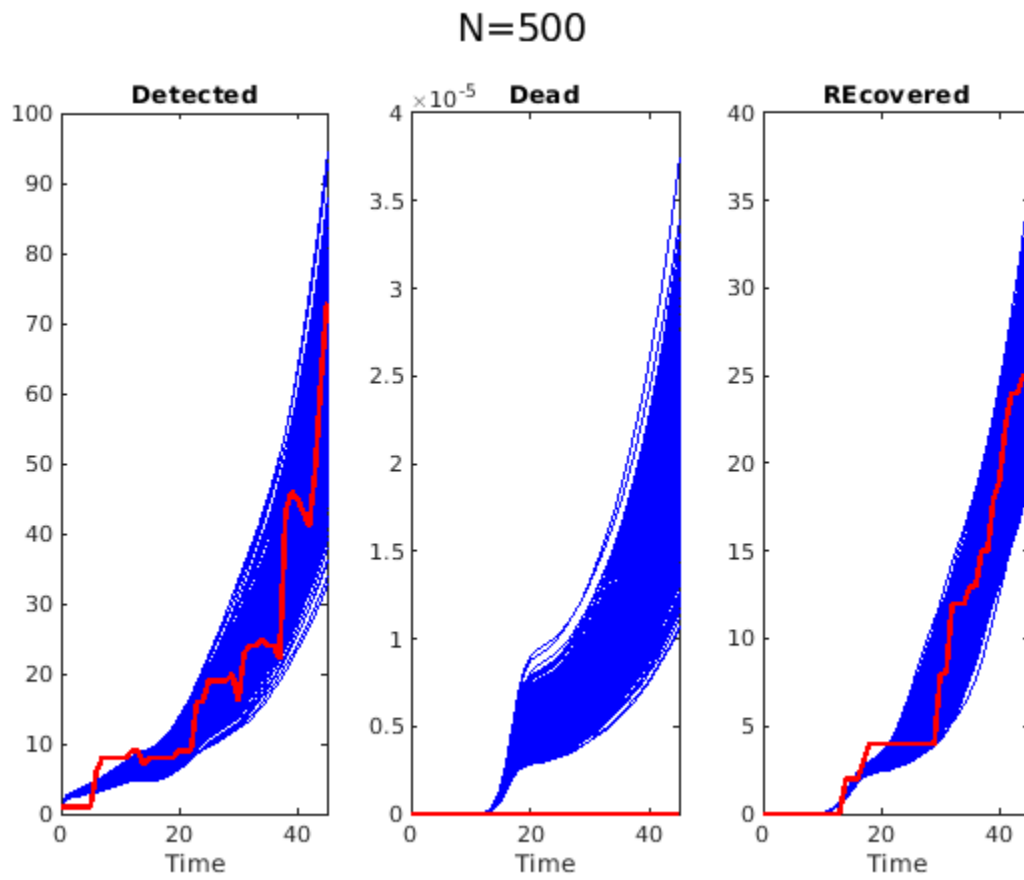
### 1.3. Identifiability analysis







## 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 data46 to the 67. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

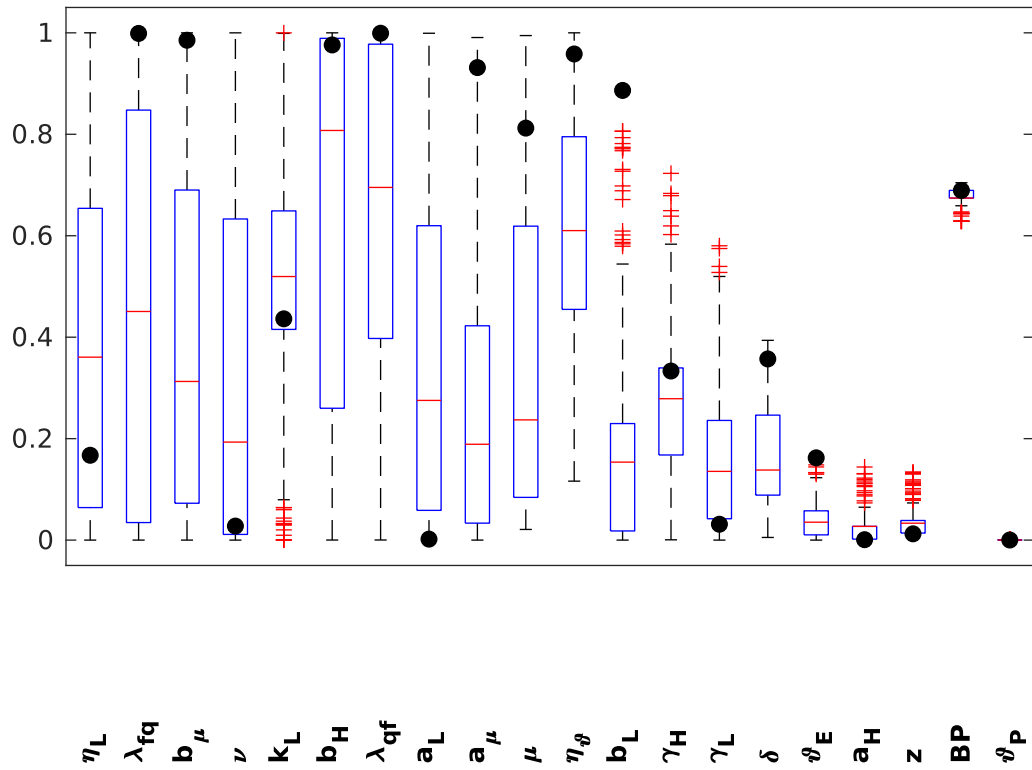
### 2.2. Estimated parameters with their intervals

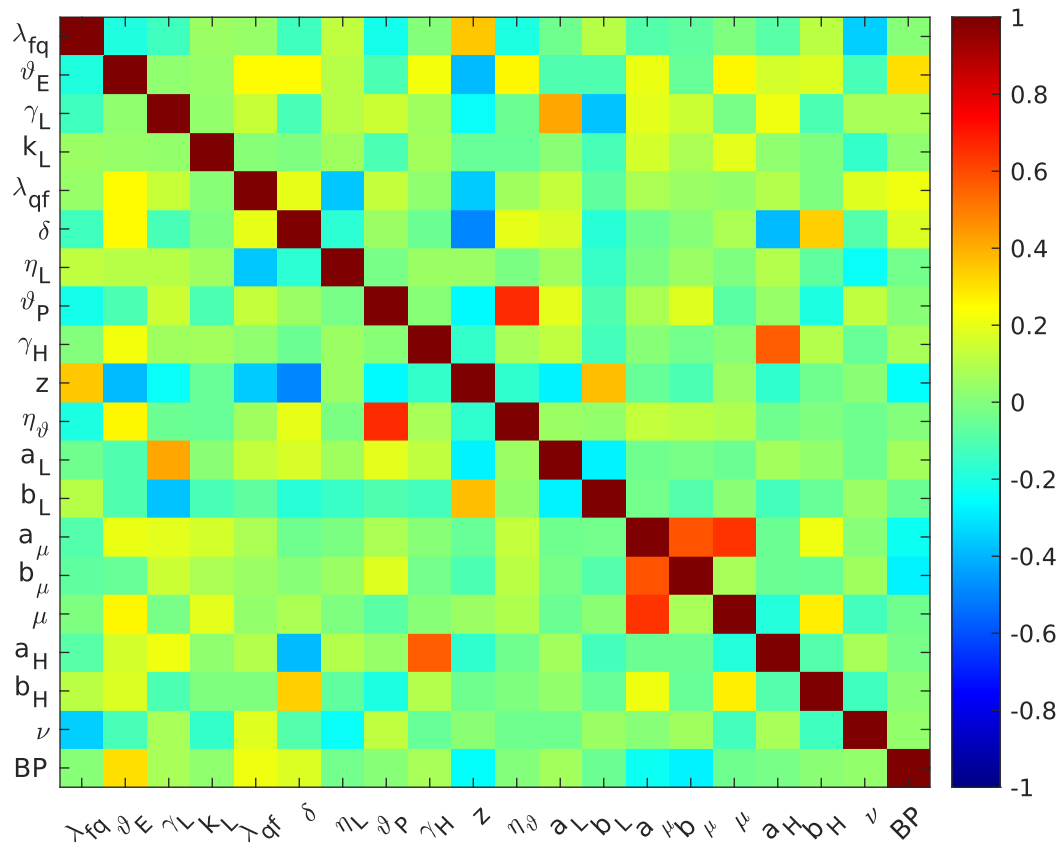
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

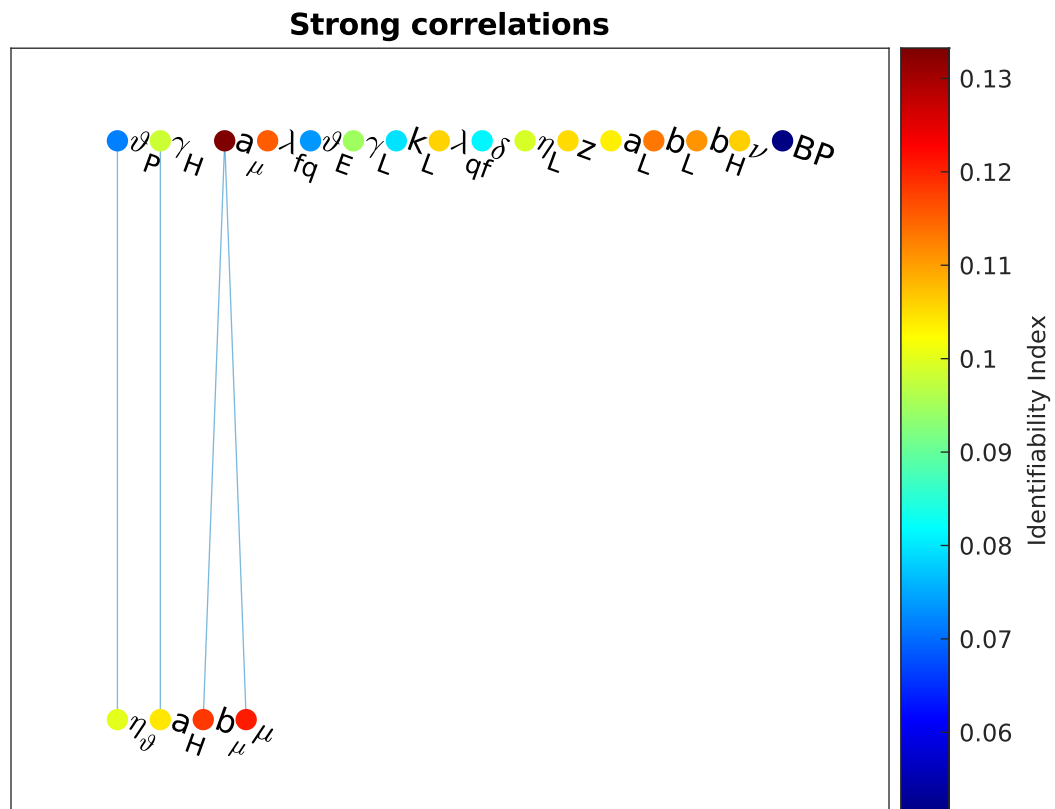
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3019'	'1'	'0.4507'	'0.9988'	'0.1155'
$\vartheta_E$	'0.1265'	'0.2128'	'0.0353'	'0.1622'	'0.0736'
$\gamma_L$	'0.0018'	'0.0544'	'0.1355'	'0.0313'	'0.0949'
$k_L$	'1'	'10'	'5.6763'	'4.9259'	'0.0796'
$\lambda_{qf}$	'0.8954'	'1'	'0.6952'	'0.9992'	'0.1059'
$\delta$	'0.0355'	'0.0832'	'0.0207'	'0.0536'	'0.0813'
$\eta_L$	'0.1189'	'0.9549'	'0.3606'	'0.1672'	'0.0992'
$\vartheta_P$	'0'	'0.0004'	'0.0002'	'0.0002'	'0.0717'
$\gamma_H$	'0.2009'	'0.3354'	'0.2787'	'0.3333'	'0.0984'
$z$	'0.264'	'0.5504'	'0.9993'	'0.3714'	'0.1053'
$\eta_{\vartheta}$	'0.5966'	'0.9829'	'0.6101'	'0.9583'	'0.1001'
$a_L$	'1'	'8.4402'	'4.8552'	'1.027'	'0.1038'
$b_L$	'1'	'13.6'	'3.1522'	'13.4105'	'0.1132'
$a_{\mu}$	'11.5165'	'14.3257'	'3.6452'	'14.0407'	'0.1332'
$b_{\mu}$	'11.1528'	'15'	'5.3784'	'14.7957'	'0.1184'
$\mu$	'0.4971'	'1'	'0.237'	'0.8122'	'0.1207'
$a_H$	'1'	'1.3138'	'1.3789'	'1.0114'	'0.1043'
$b_H$	'10.7527'	'14.7617'	'12.3053'	'14.6657'	'0.1111'
$\nu$	'0.6216'	'31.081'	'96.6122'	'13.8138'	'0.1062'
BP	'43.4513'	'51.3393'	'45.5'	'46.5'	'0.0515'

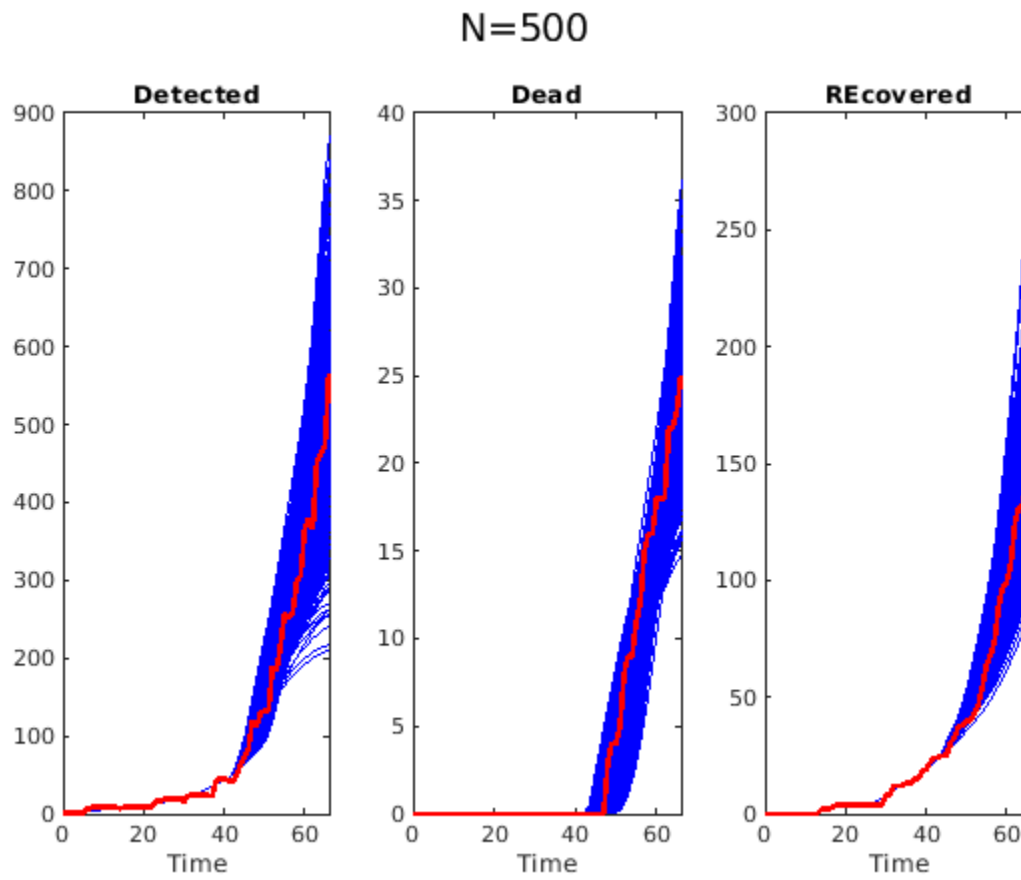
## 2.3. Identifiability analysis







## 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 data67 to the 89. The status of the validation is: COMPLETED.

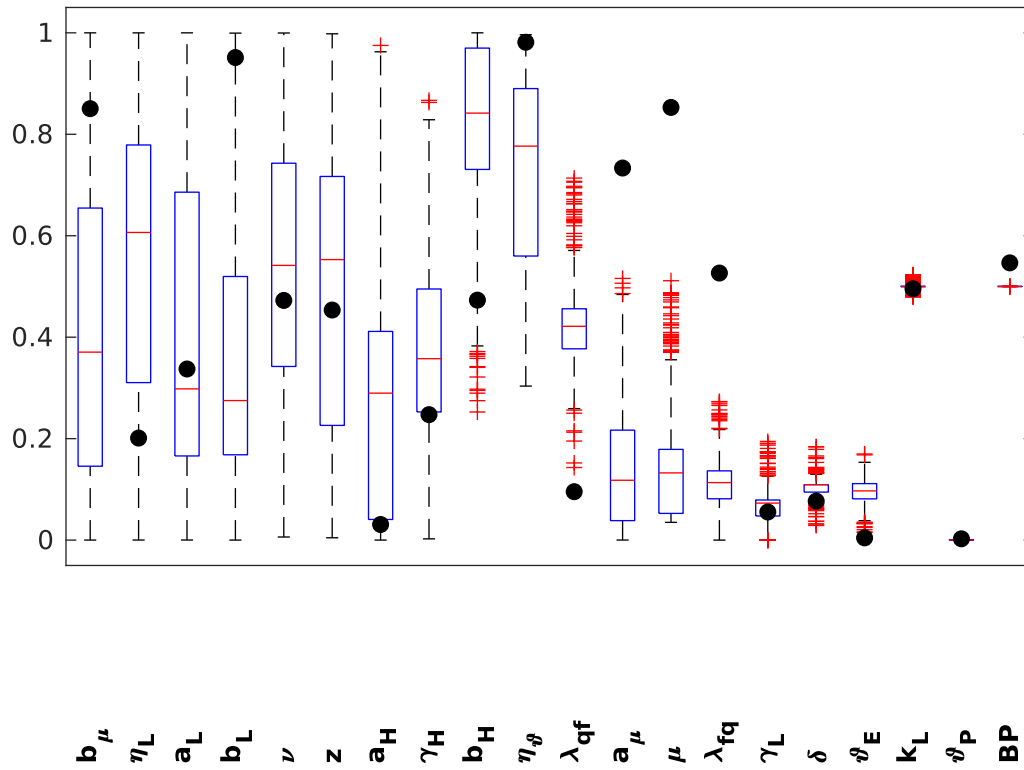
The number of estimations needed to perform the validation was1000.

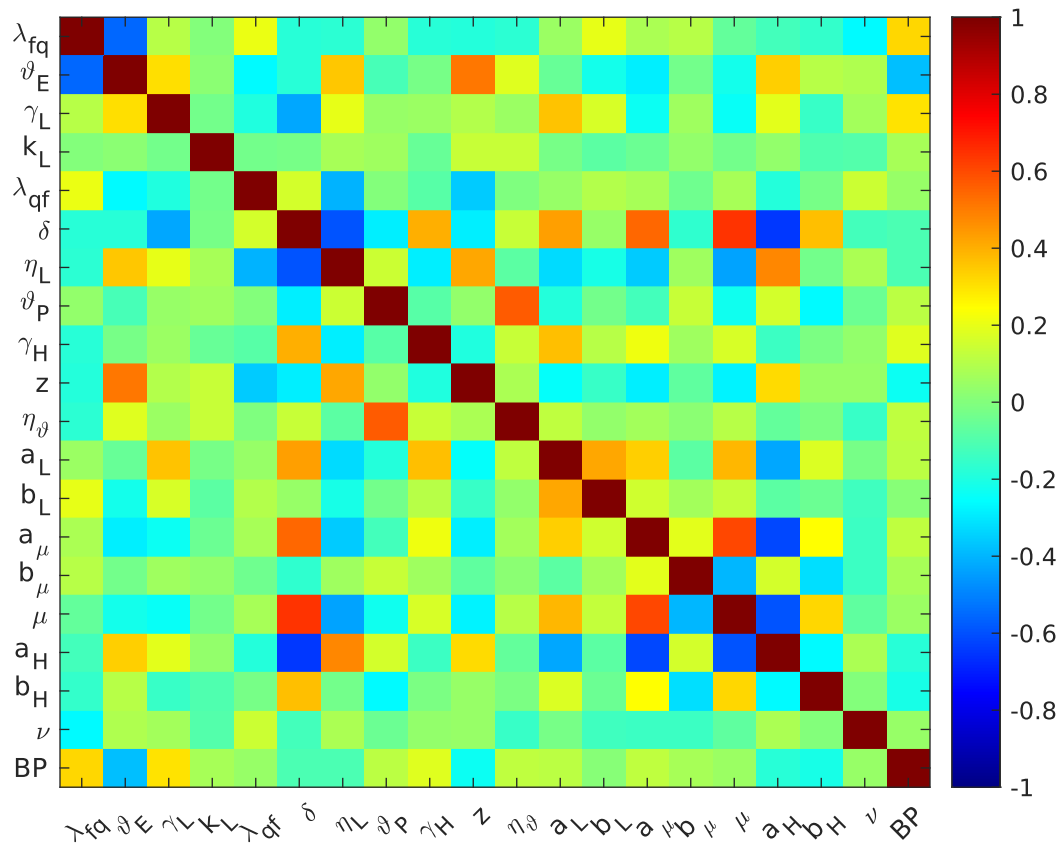
### 3.2. Estimated parameters with their intervals

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

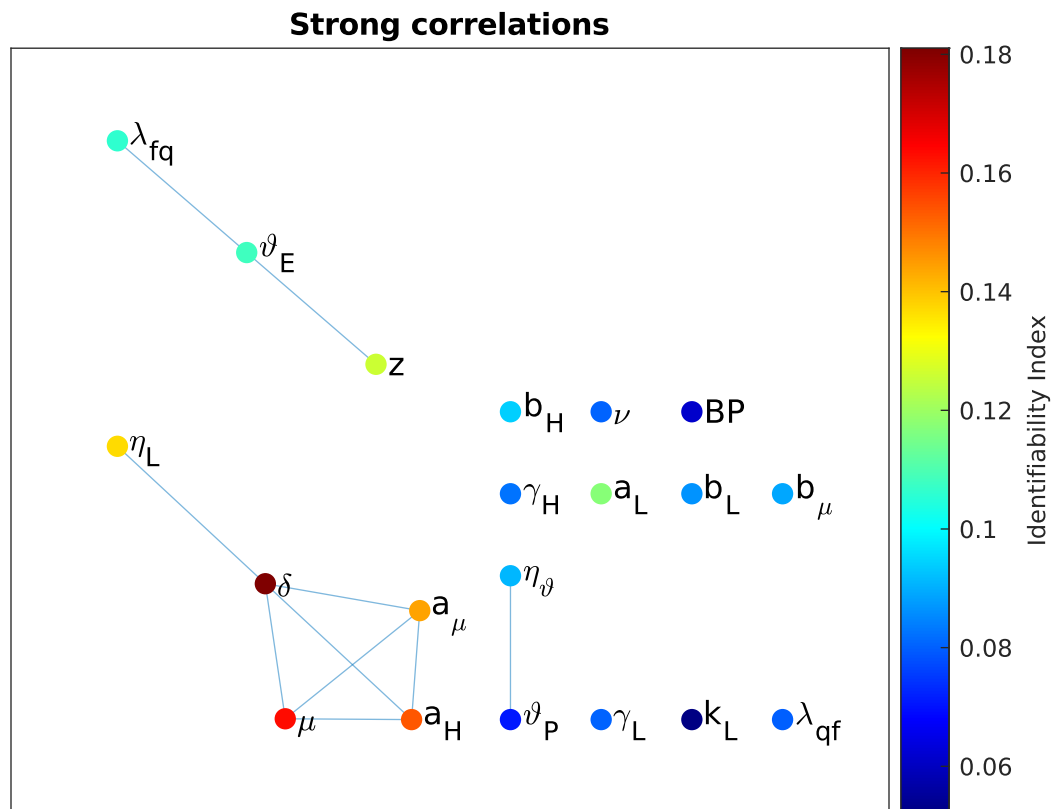
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0838'	'0.1428'	'0.1133'	'0.5265'	'0.1061'
$\vartheta_E$	'0.0914'	'0.1026'	'0.097'	'0.0044'	'0.1082'
$\gamma_L$	'0.0583'	'0.0875'	'0.0729'	'0.0554'	'0.0806'
$k_L$	'5.3723'	'5.6273'	'5.4998'	'5.4601'	'0.0523'
$\lambda_{qf}$	'0.3966'	'0.4463'	'0.4214'	'0.0954'	'0.08'
$\delta$	'0.0112'	'0.0216'	'0.0164'	'0.0115'	'0.181'
$\eta_L$	'0.5668'	'0.6462'	'0.6065'	'0.2012'	'0.137'
$\vartheta_P$	'0.0002'	'0.0005'	'0.0004'	'0.0026'	'0.071'
$\gamma_H$	'0.3342'	'0.381'	'0.3576'	'0.2473'	'0.0828'
$z$	'15.4117'	'17.7661'	'16.5889'	'13.6058'	'0.1261'
$\eta_{\vartheta}$	'0.7507'	'0.8026'	'0.7766'	'0.9814'	'0.0912'
$a_L$	'4.61'	'5.7369'	'5.1734'	'5.7224'	'0.1172'
$b_L$	'4.3927'	'5.3096'	'4.8511'	'14.3182'	'0.0869'
$a_{\mu}$	'2.338'	'2.9653'	'2.6516'	'11.2685'	'0.1439'
$b_{\mu}$	'5.6649'	'6.7108'	'6.1878'	'12.9072'	'0.0893'
$\mu$	'0.0945'	'0.1704'	'0.1325'	'0.853'	'0.1632'
$a_H$	'4.6616'	'5.4504'	'5.056'	'1.4306'	'0.1538'
$b_H$	'12.3106'	'13.2582'	'12.7844'	'7.6229'	'0.0943'
$\nu$	'253.8912'	'287.6337'	'270.7625'	'236.248'	'0.0806'
BP	'67.4283'	'67.5717'	'67.5'	'69.5'	'0.0617'

### 3.3. Identifiability analysis

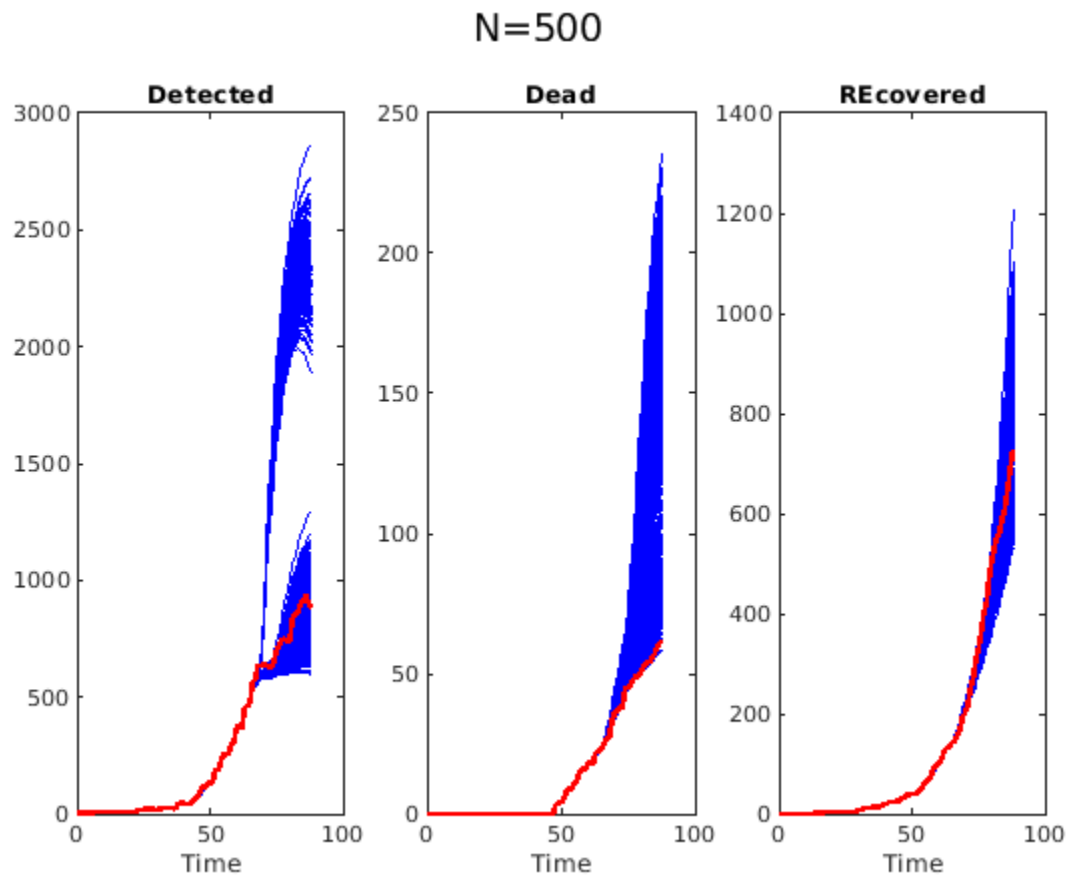








### 3.4. Uncertainty analysis



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## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data89 to the 112. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

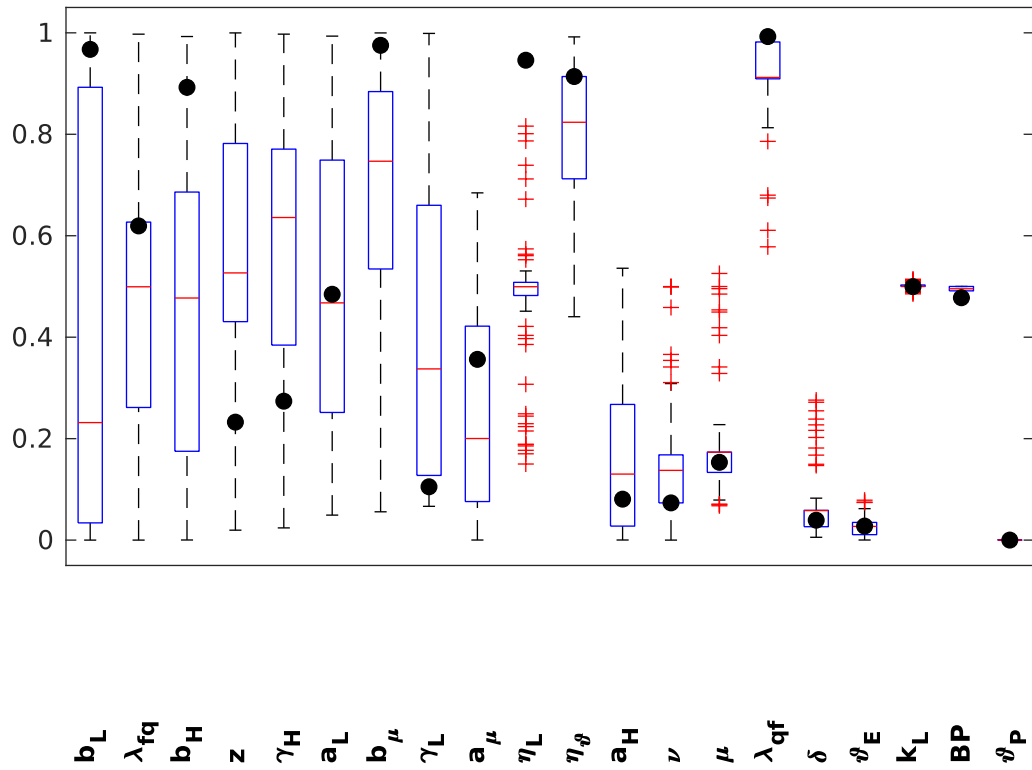
### 4.2. Estimated parameters with their intervals

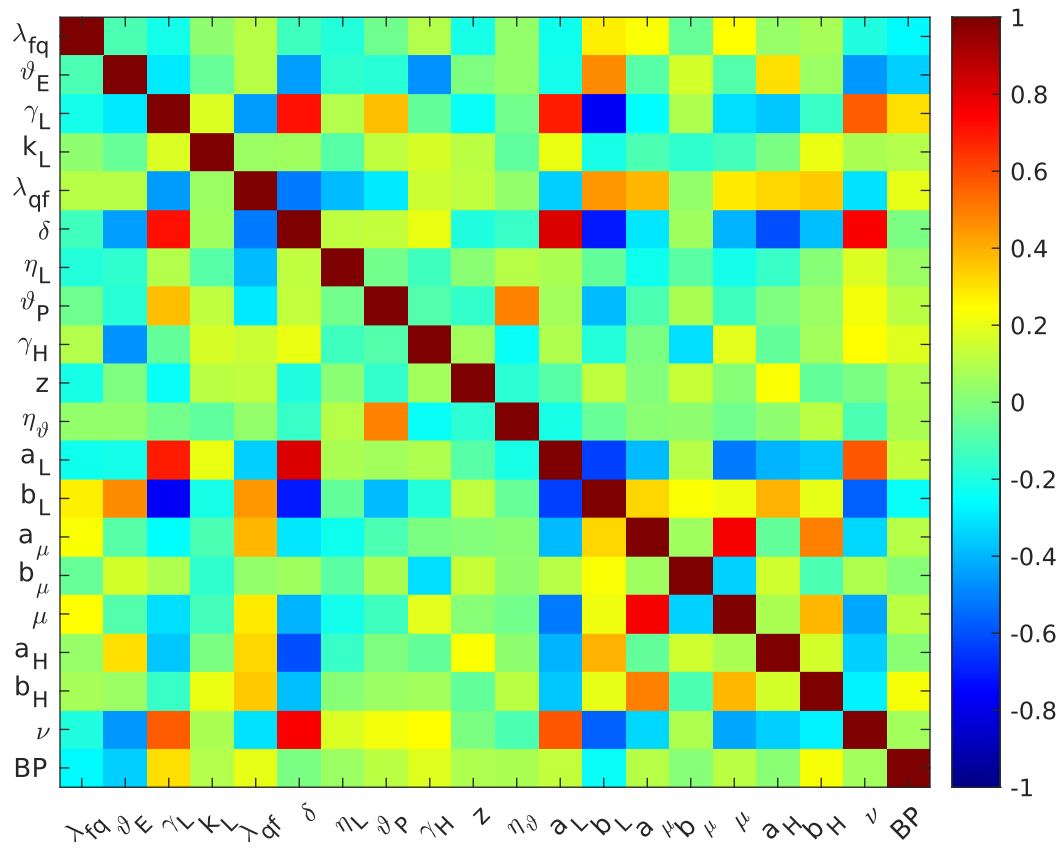
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

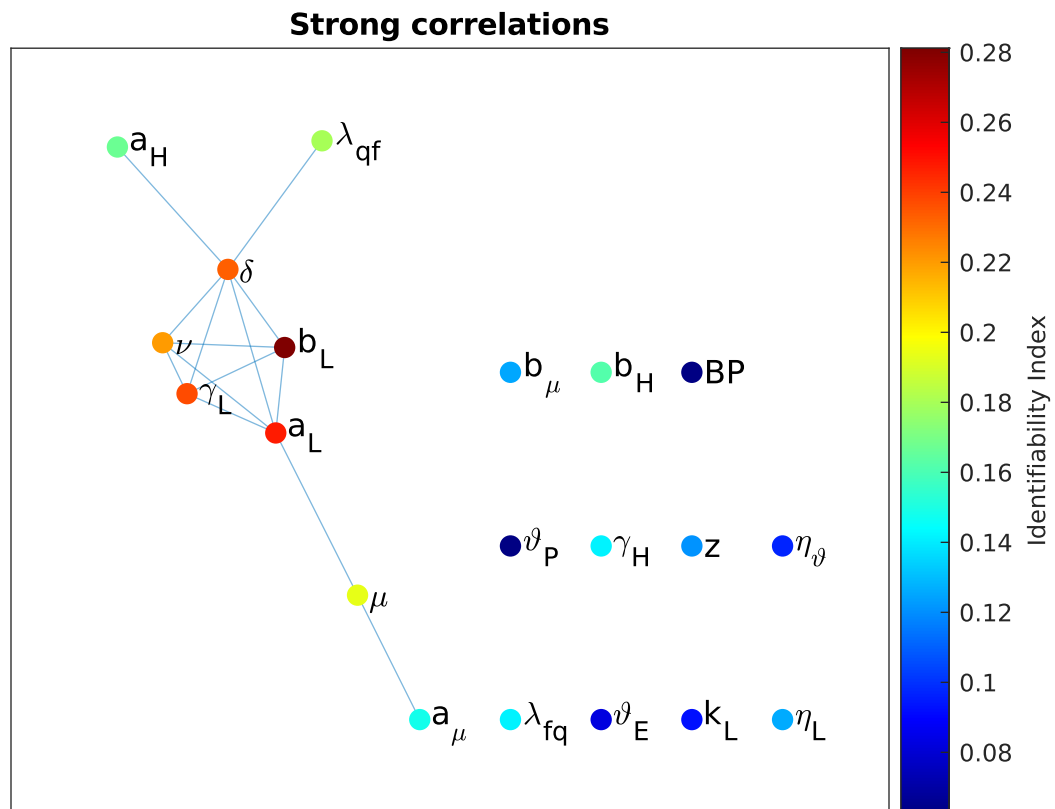
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.1521'	'1'	'0.4994'	'0.6193'	'0.1416'
$\vartheta_E$	'0'	'0.0622'	'0.0271'	'0.0277'	'0.0832'
$\gamma_L$	'0.007'	'0.1984'	'0.3375'	'0.1051'	'0.2372'
$k_L$	'1'	'10'	'5.5029'	'5.4968'	'0.0934'
$\lambda_{qf}$	'0'	'1'	'0.9093'	'0.9926'	'0.1801'
$\delta$	'0'	'0.0133'	'0.0088'	'0.0059'	'0.2334'
$\eta_L$	'0'	'1'	'0.4995'	'0.946'	'0.1264'
$\vartheta_P$	'0'	'0.0001'	'0.0001'	'0'	'0.0631'
$\gamma_H$	'0.0081'	'1'	'0.6359'	'0.2738'	'0.1418'
$z$	'0'	'15.6967'	'15.8012'	'6.9763'	'0.1213'
$\eta_{\vartheta}$	'0.6022'	'1'	'0.8178'	'0.9138'	'0.097'
$a_L$	'1'	'15'	'7.547'	'7.7846'	'0.2474'
$b_L$	'1'	'15'	'4.2431'	'14.5433'	'0.2812'
$a_{\mu}$	'1'	'15'	'3.8034'	'5.9884'	'0.1488'
$b_{\mu}$	'1'	'15'	'11.4564'	'14.6546'	'0.1252'
$\mu$	'0'	'0.345'	'0.1734'	'0.1534'	'0.1934'
$a_H$	'1'	'14.5265'	'2.8383'	'2.1299'	'0.1675'
$b_H$	'1'	'15'	'7.6815'	'13.4958'	'0.1621'
$\nu$	'17.97'	'500'	'68.8681'	'36.6735'	'0.2204'
BP	'88.4912'	'100.6236'	'89.2956'	'88.5'	'0.0629'

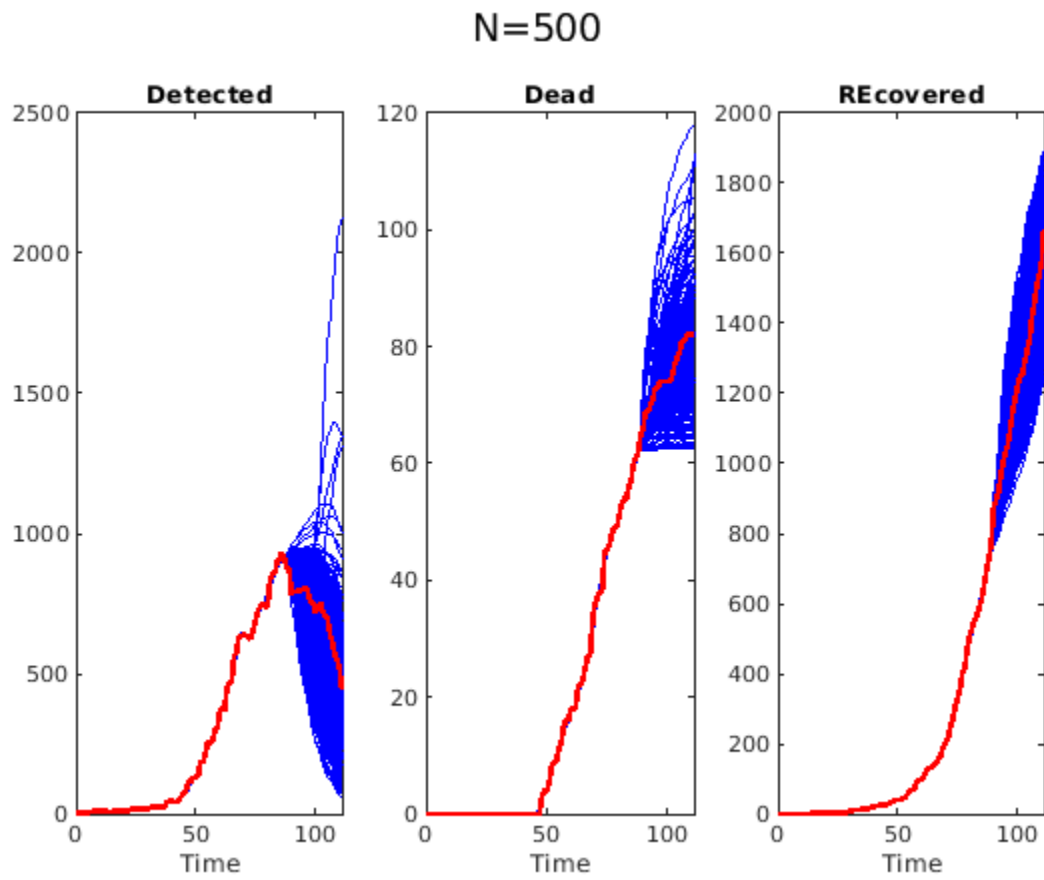
## 4.3. Identifiability analysis







#### 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 data112 to the 148. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

### 5.2. Estimated parameters with their intervals

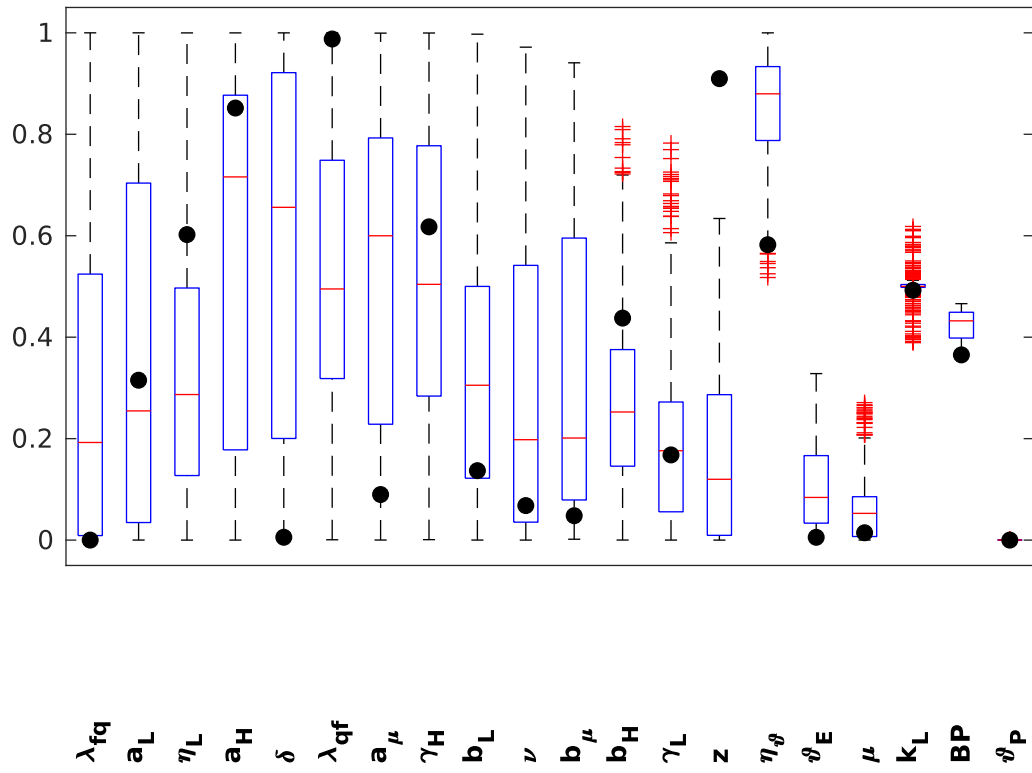
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

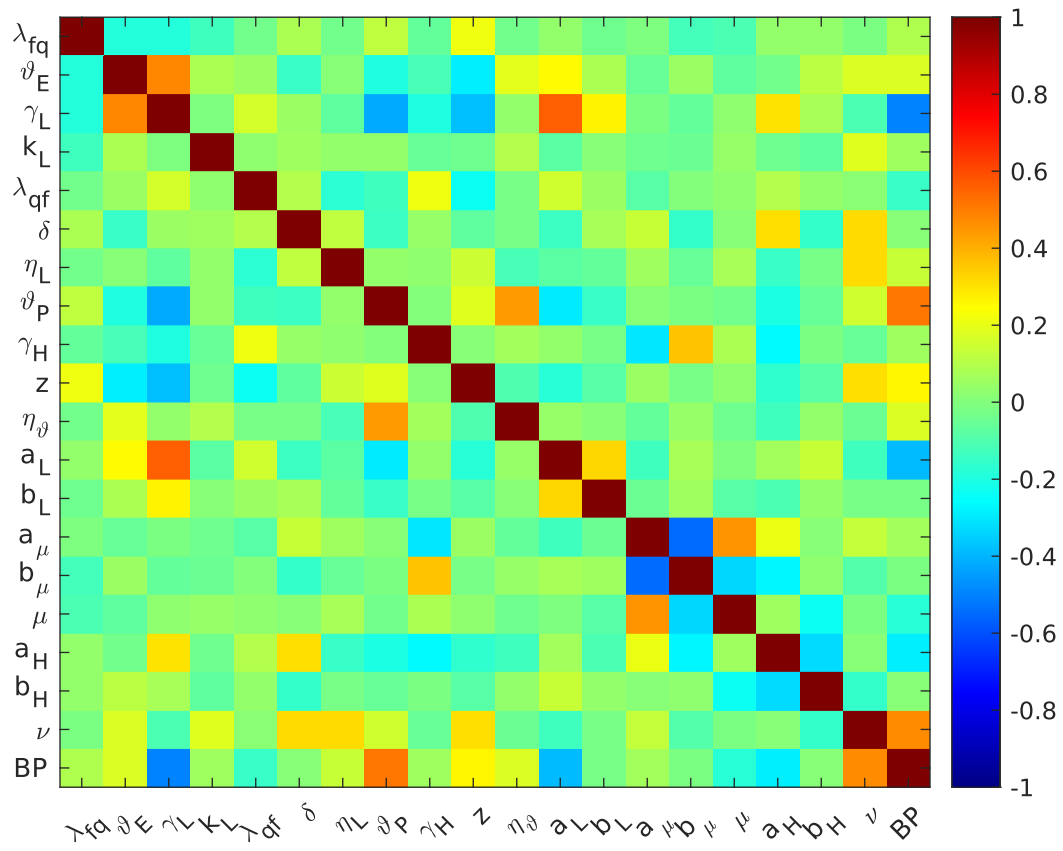
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

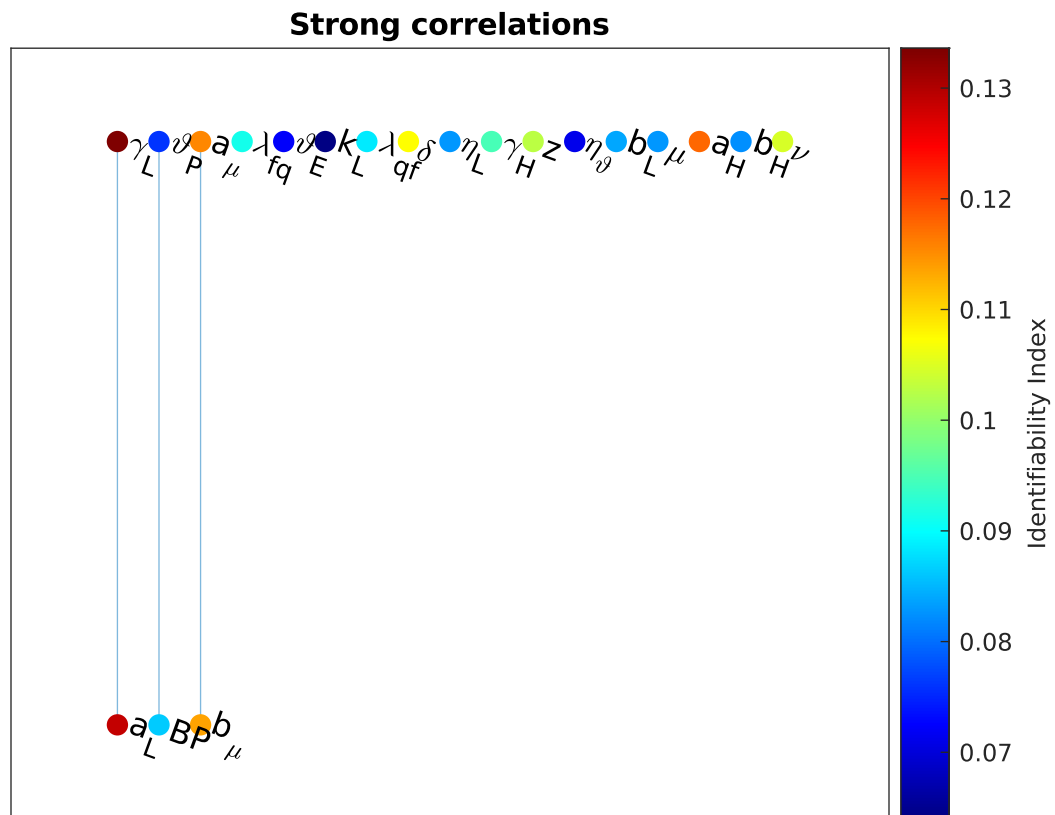
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0.1924'	'0'	'0.0914'
$\vartheta_E$	'0.0053'	'0.0099'	'0.0841'	'0.0055'	'0.0723'
$\gamma_L$	'0.0808'	'0.1728'	'0.1761'	'0.1679'	'0.1336'
$k_L$	'1'	'10'	'5.501'	'5.4332'	'0.064'
$\lambda_{qf}$	'0.2767'	'1'	'0.4951'	'0.9878'	'0.0886'
$\delta$	'0'	'0.0018'	'0.0984'	'0.0008'	'0.1073'
$\eta_L$	'0.1615'	'1'	'0.2869'	'0.6023'	'0.0829'
$\vartheta_P$	'0'	'0'	'0.0001'	'0'	'0.0761'
$\gamma_H$	'0'	'1'	'0.5042'	'0.6175'	'0.095'
$z$	'6.1666'	'30'	'3.5966'	'27.2909'	'0.1028'
$\eta_{\vartheta}$	'0.5348'	'1'	'0.8797'	'0.5823'	'0.0713'
$a_L$	'1'	'9.9318'	'4.5659'	'5.4124'	'0.1288'
$b_L$	'1.7577'	'13.6'	'5.2735'	'2.9161'	'0.0841'
$a_{\mu}$	'1'	'15'	'9.3988'	'2.2575'	'0.1155'
$b_{\mu}$	'1'	'15'	'3.8172'	'1.6733'	'0.1136'
$\mu$	'0'	'0.0326'	'0.0527'	'0.0145'	'0.0828'
$a_H$	'1'	'15'	'11.0234'	'12.9245'	'0.1178'
$b_H$	'1'	'15'	'4.536'	'7.1269'	'0.0825'
$\nu$	'15.2593'	'47.867'	'98.9692'	'34.0273'	'0.1046'
BP	'107.3088'	'116.8583'	'114.5'	'110.5431'	'0.0864'



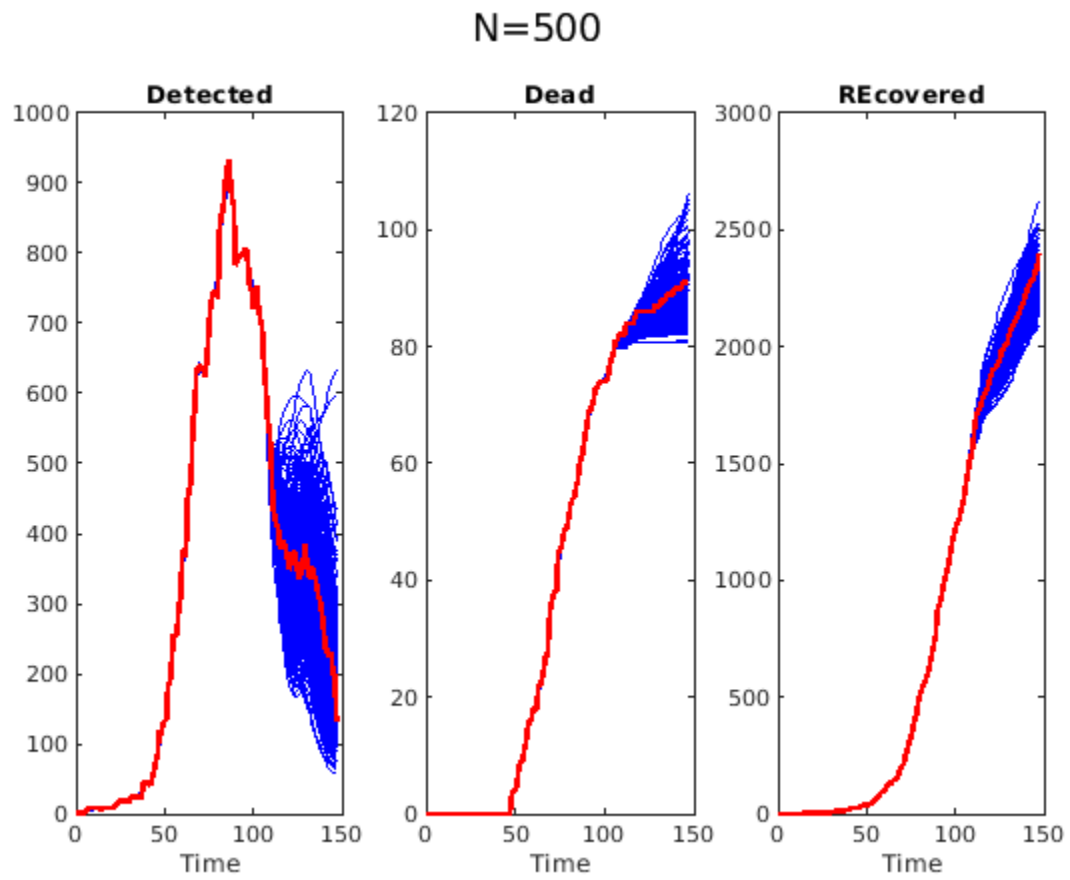
### 5.3. Identifiability analysis







## 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 data148 to the 248. The status of the validation is: COMPLETED.

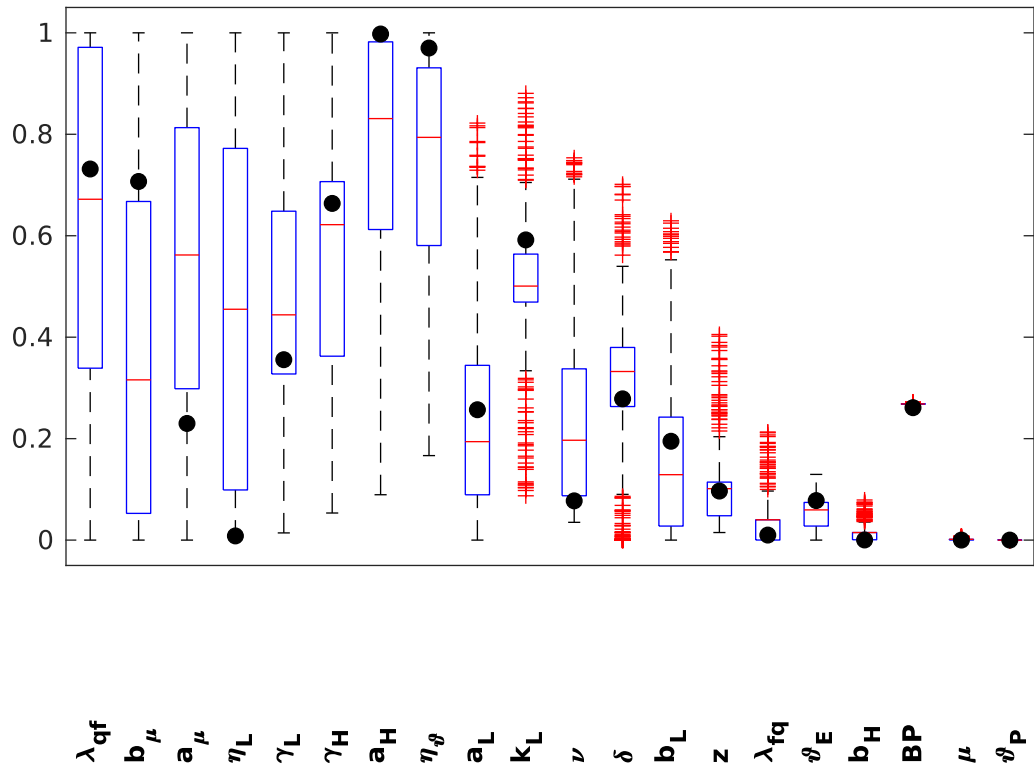
The number of estimations needed to perform the validation was1000.

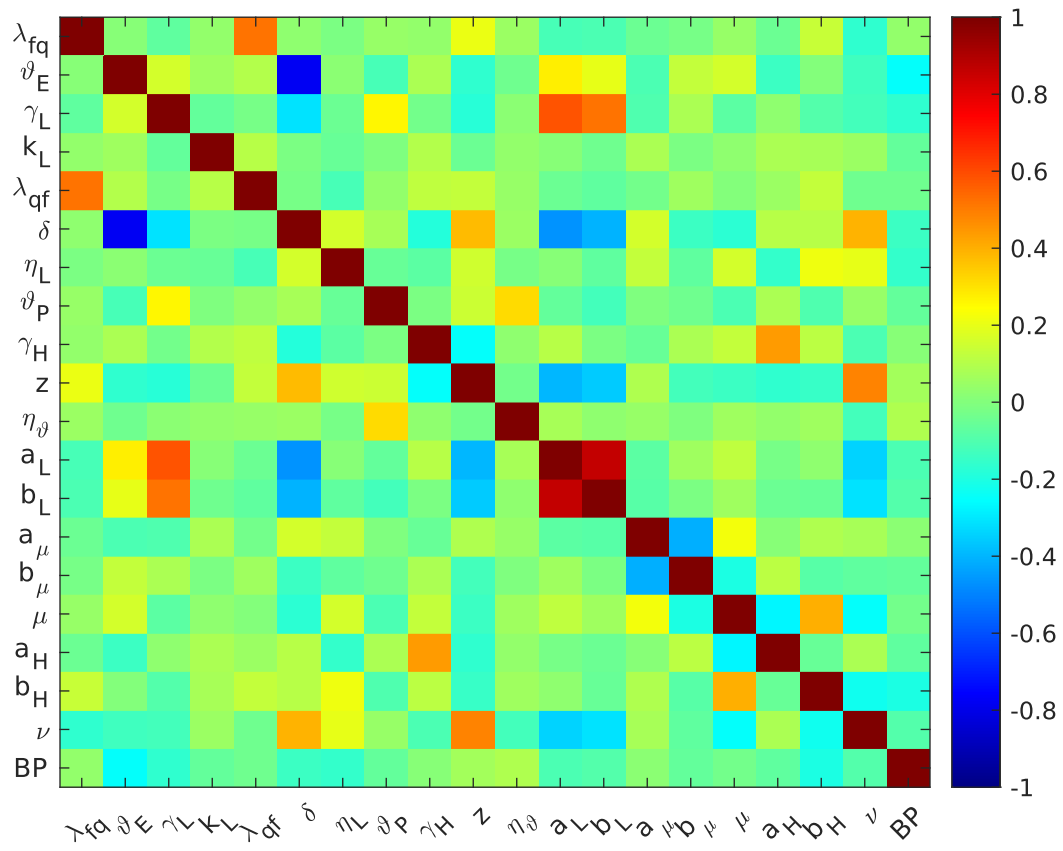
### 6.2. Estimated parameters with their intervals

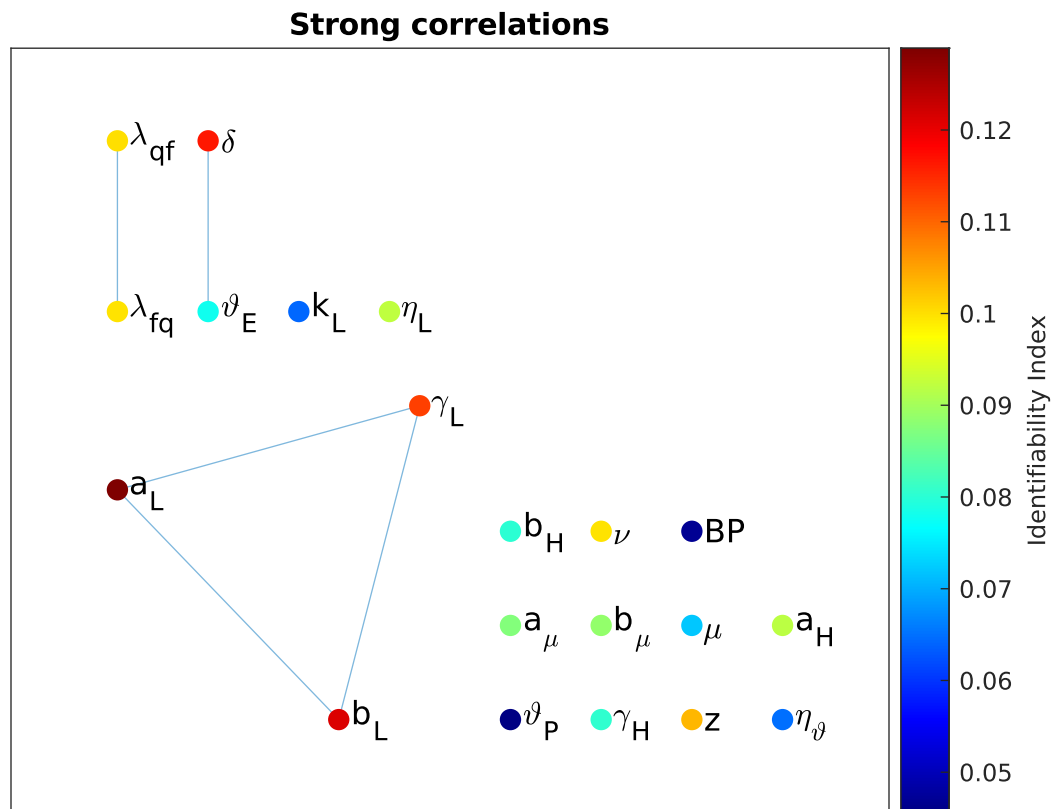
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0816'	'0.04'	'0.0099'	'0.0997'
$\vartheta_E$	'0.0553'	'0.0638'	'0.0595'	'0.0779'	'0.078'
$\gamma_L$	'0.4171'	'0.471'	'0.4441'	'0.3556'	'0.1131'
$k_L$	'5.258'	'5.7554'	'5.5067'	'6.3261'	'0.0642'
$\lambda_{qf}$	'0.6299'	'0.714'	'0.6719'	'0.7315'	'0.1003'
$\delta$	'0.0456'	'0.0541'	'0.0499'	'0.0418'	'0.1164'
$\eta_L$	'0.4109'	'0.4992'	'0.4551'	'0.0082'	'0.0923'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0456'
$\gamma_H$	'0.5907'	'0.653'	'0.6218'	'0.6637'	'0.0807'
$z$	'2.0472'	'4.0362'	'3.0417'	'2.9001'	'0.1033'
$\eta_{\vartheta}$	'0.7678'	'0.8201'	'0.7939'	'0.97'	'0.0652'
$a_L$	'3.2665'	'4.1675'	'3.717'	'4.5978'	'0.1289'
$b_L$	'2.4053'	'3.2055'	'2.8054'	'3.728'	'0.1212'
$a_{\mu}$	'8.3125'	'9.4254'	'8.8689'	'4.2194'	'0.0875'
$b_{\mu}$	'4.8366'	'6.0077'	'5.4221'	'10.8976'	'0.0888'
$\mu$	'0'	'0.0292'	'0.0016'	'0.0001'	'0.0722'
$a_H$	'12.0403'	'13.2257'	'12.633'	'14.9674'	'0.0919'
$b_H$	'1'	'1.7476'	'1.2088'	'1.0035'	'0.0803'
$\nu$	'81.5016'	'115.3453'	'98.4234'	'38.685'	'0.0999'
BP	'148.3716'	'148.6284'	'148.5'	'147.5'	'0.0471'

### 6.3. Identifiability analysis

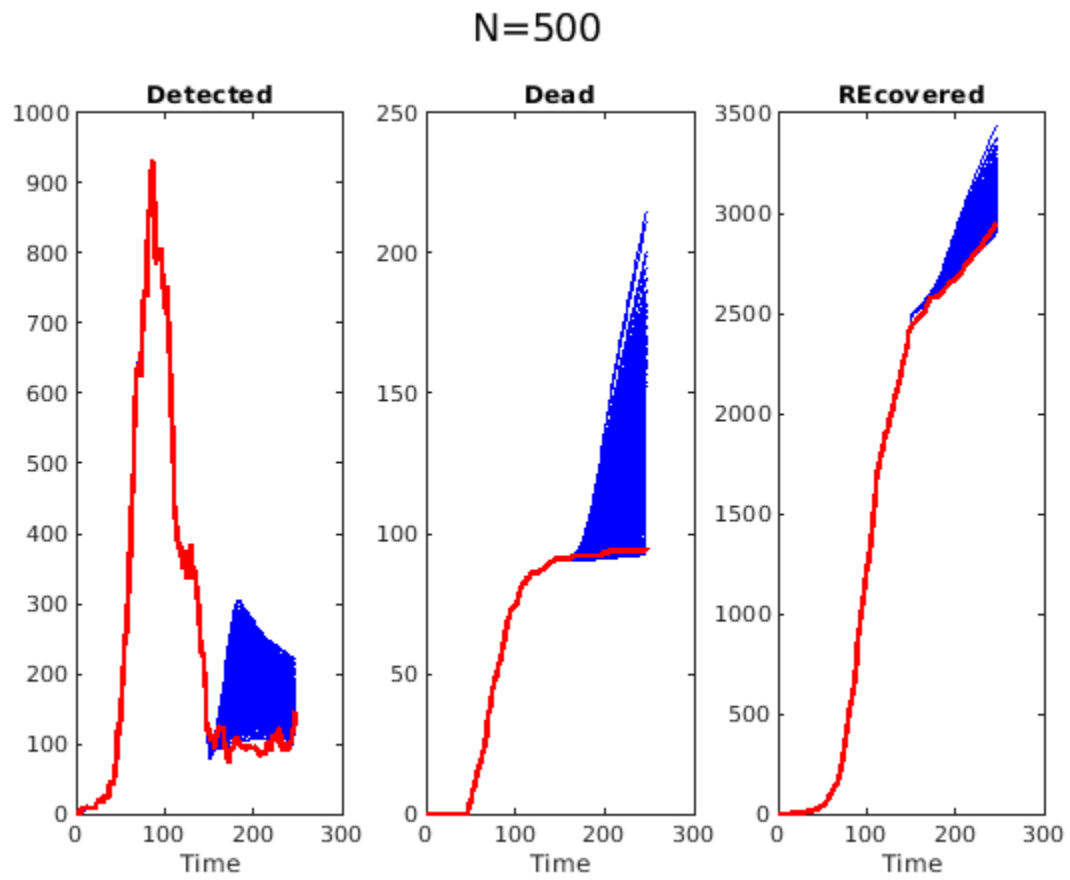








## 6.4. Uncertainty analysis



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## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data248 to the 269. The status of the validation is: COMPLETED.

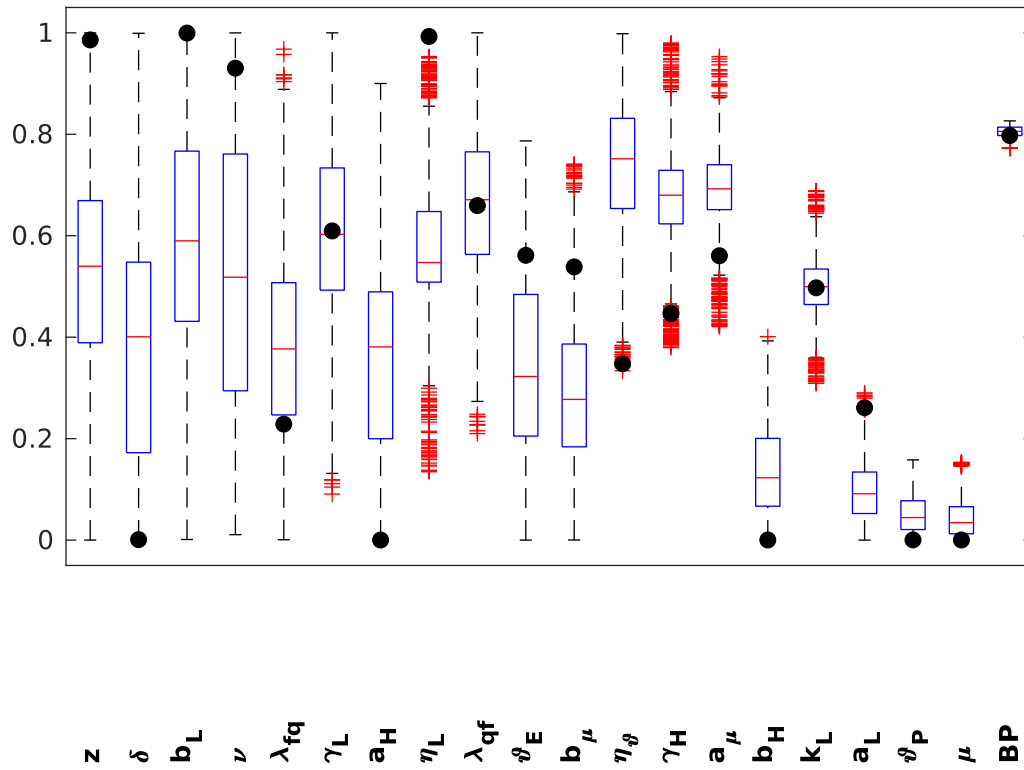
The number of estimations needed to perform the validation was1000.

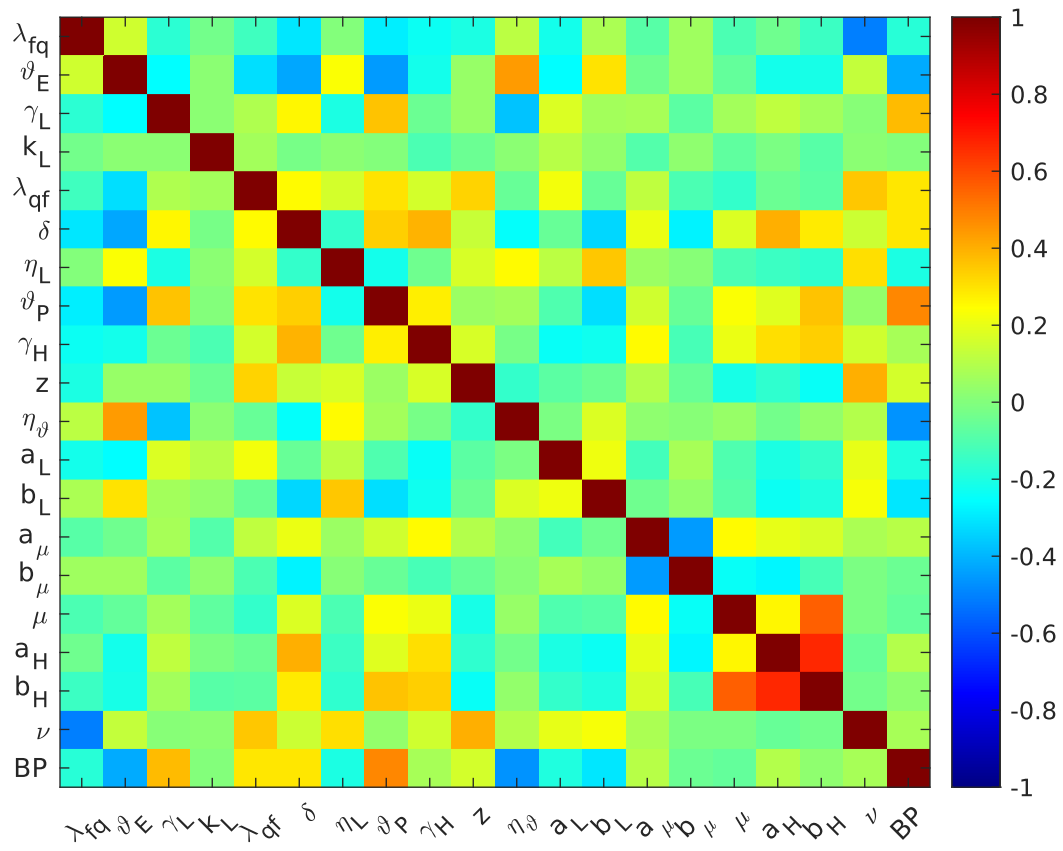
### 7.2. Estimated parameters with their intervals

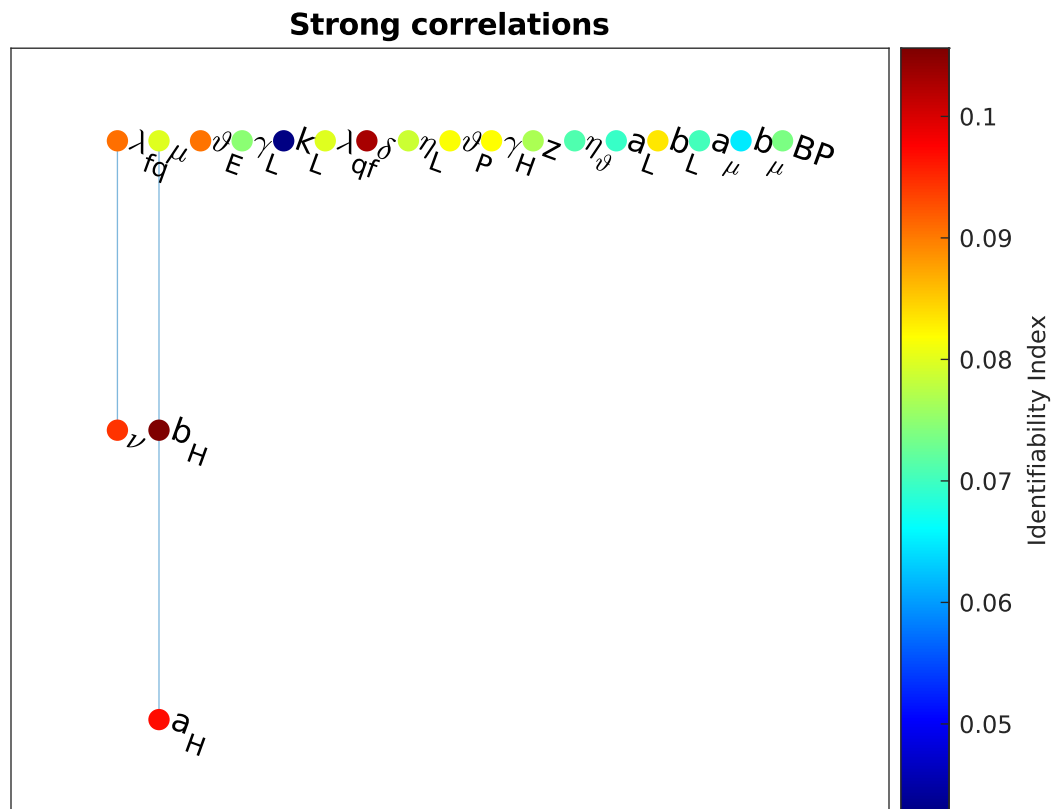
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.361'	'0.3927'	'0.3769'	'0.2286'	'0.0908'
$\vartheta_E$	'0.31'	'0.3352'	'0.3226'	'0.5614'	'0.0904'
$\gamma_L$	'0.5888'	'0.6168'	'0.6028'	'0.6095'	'0.0748'
$k_L$	'5.4236'	'5.5684'	'5.496'	'5.476'	'0.0427'
$\lambda_{qf}$	'0.657'	'0.6851'	'0.671'	'0.6595'	'0.08'
$\delta$	'0.0572'	'0.063'	'0.0601'	'0.0001'	'0.103'
$\eta_L$	'0.5296'	'0.5648'	'0.5472'	'0.9928'	'0.0788'
$\vartheta_P$	'0.0411'	'0.0477'	'0.0444'	'0.0004'	'0.0816'
$\gamma_H$	'0.6675'	'0.6923'	'0.6799'	'0.4468'	'0.0818'
$z$	'15.6795'	'16.7141'	'16.1968'	'29.5806'	'0.0767'
$\eta_{\vartheta}$	'0.7383'	'0.7652'	'0.7517'	'0.3477'	'0.0711'
$a_L$	'2.1478'	'2.4092'	'2.2785'	'4.6545'	'0.0695'
$b_L$	'9.0191'	'9.5002'	'9.2597'	'14.9932'	'0.0834'
$a_{\mu}$	'10.5135'	'10.8755'	'10.6945'	'8.8477'	'0.0704'
$b_{\mu}$	'4.6858'	'5.081'	'4.8834'	'8.5396'	'0.0651'
$\mu$	'0.0295'	'0.0394'	'0.0344'	'0.0003'	'0.0799'
$a_H$	'6.1349'	'6.5296'	'6.3322'	'1.0027'	'0.0968'
$b_H$	'2.6221'	'2.8189'	'2.7205'	'1.0037'	'0.1056'
$\nu$	'248.5024'	'269.7468'	'259.1246'	'465.1688'	'0.0945'
BP	'245.4015'	'245.5985'	'245.5'	'244.5'	'0.0738'

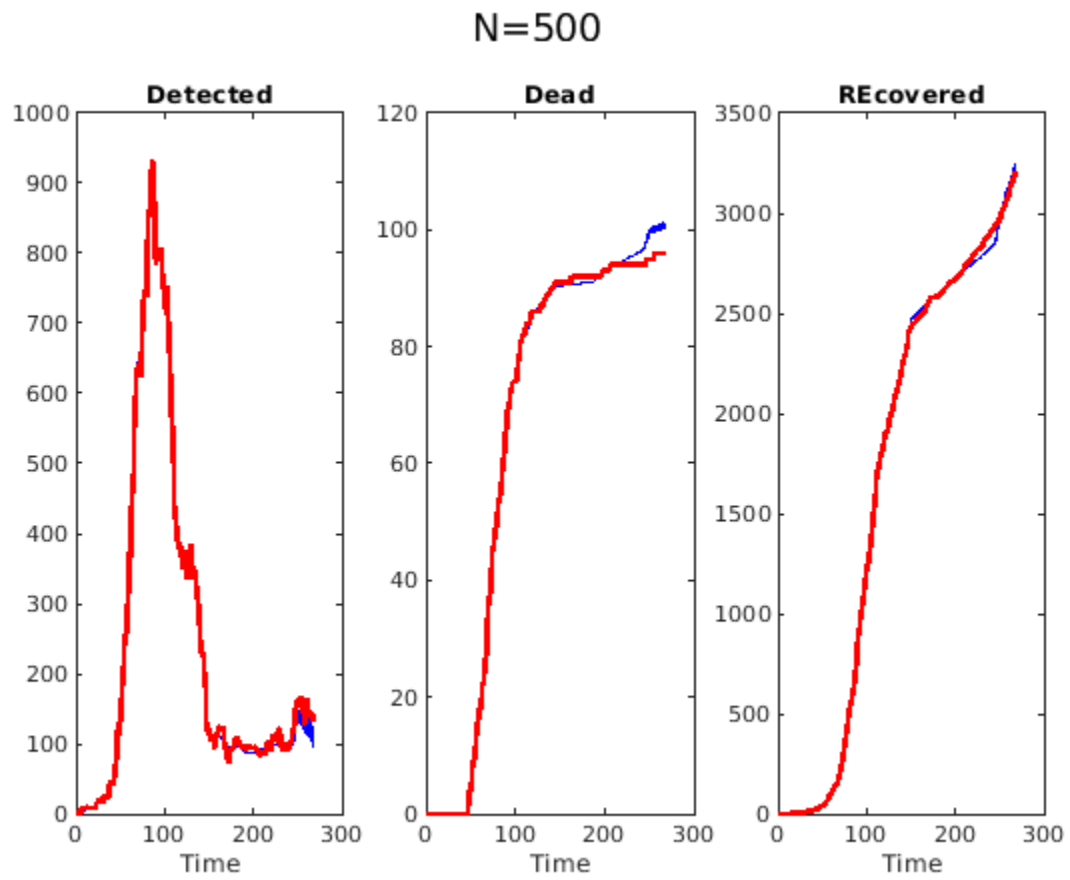
### 7.3. Identifiability analysys







## 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 data269 to the 294. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

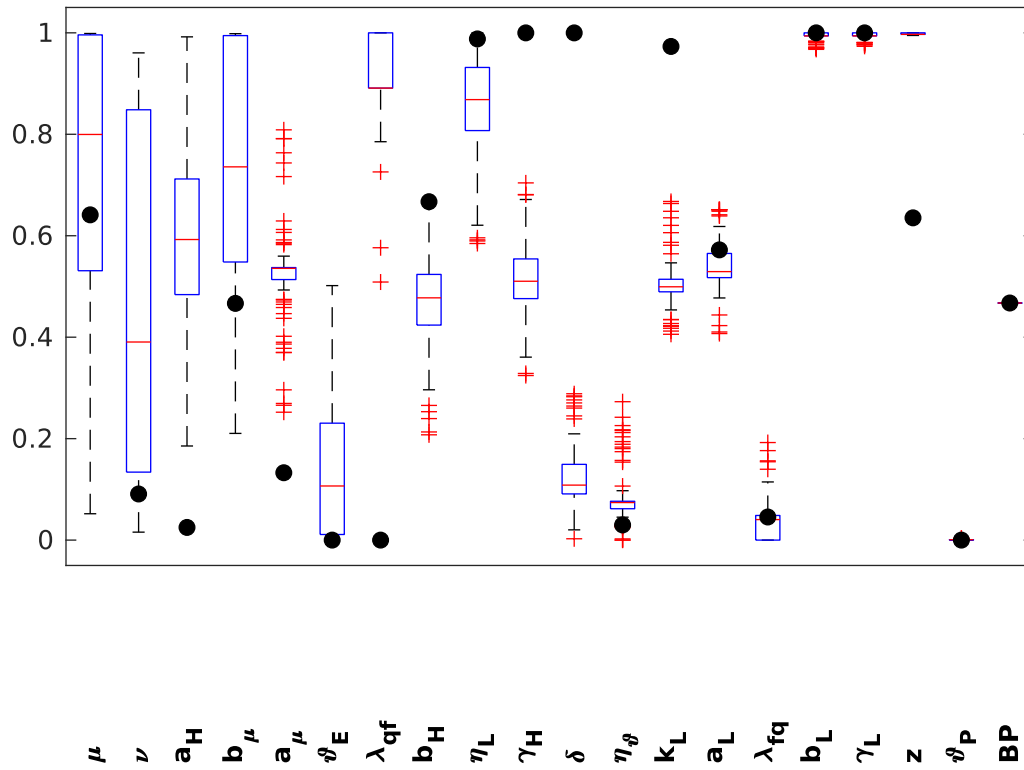
### 8.2. Estimated parameters with their intervals

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

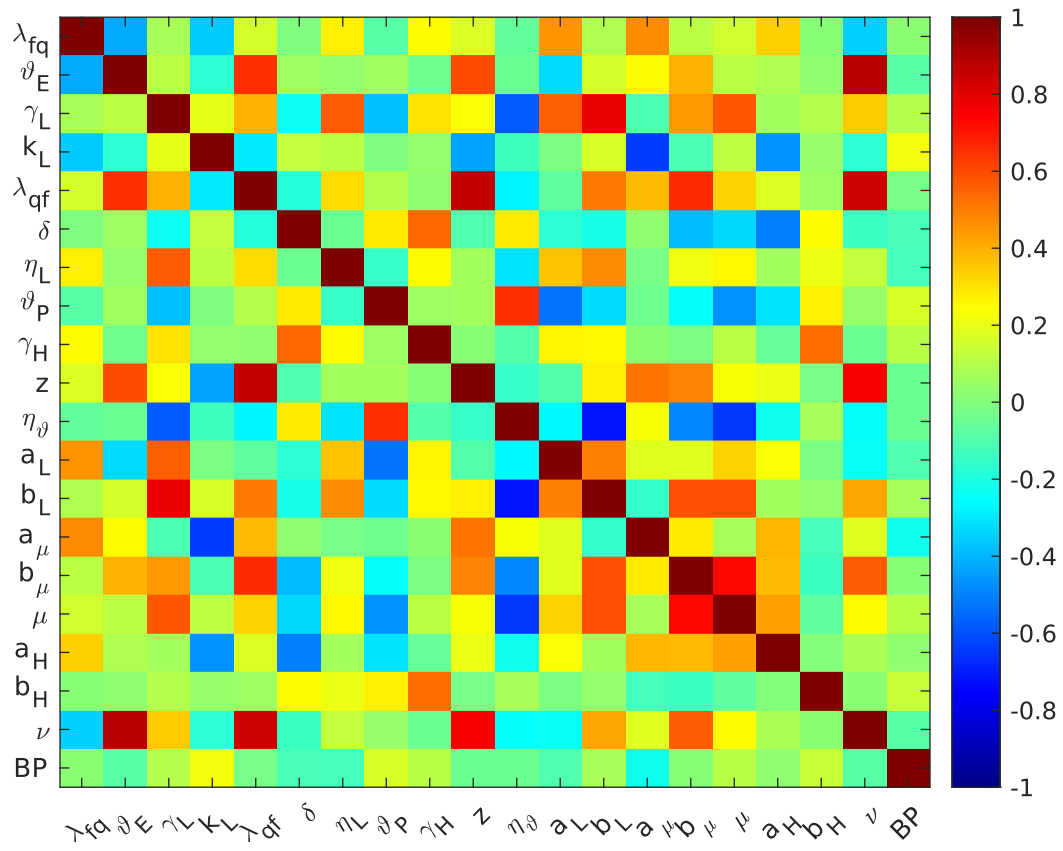
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

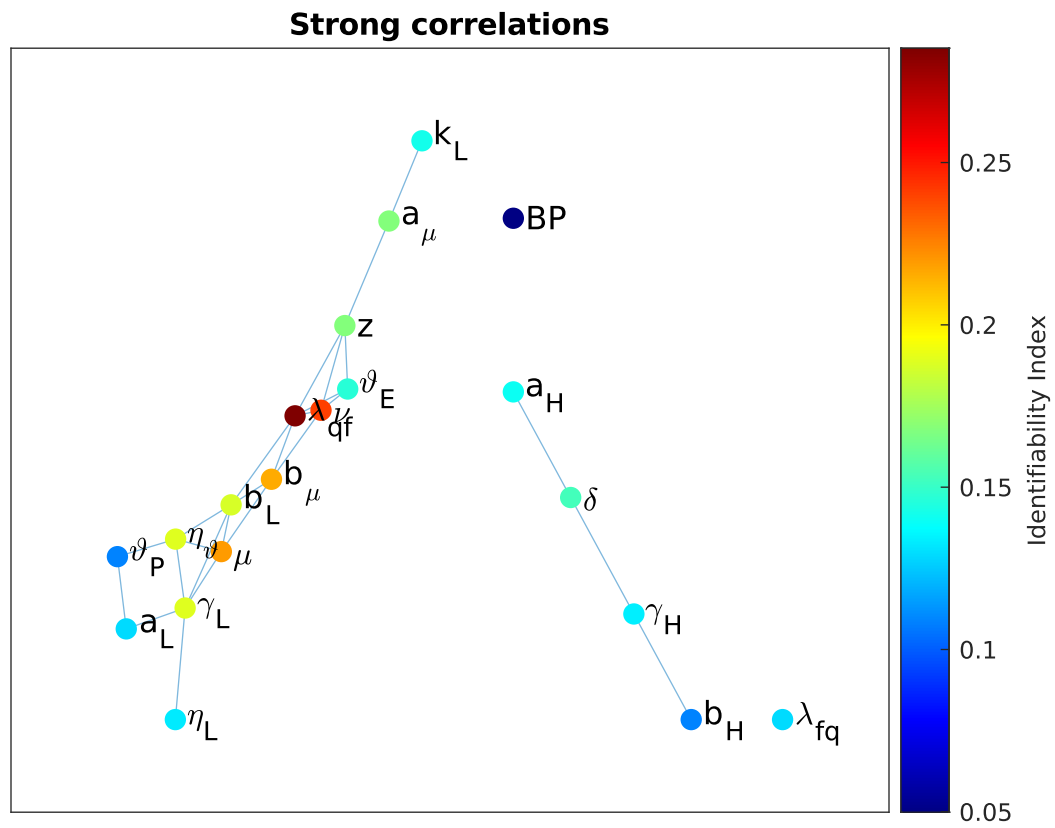
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0285'	'0.0822'	'0.0404'	'0.0455'	'0.1294'
$\vartheta_E$	'0'	'0'	'0.1067'	'0'	'0.1471'
$\gamma_L$	'0.253'	'1'	'0.994'	'0.9999'	'0.1896'
$k_L$	'1'	'10'	'5.4942'	'9.7583'	'0.1426'
$\lambda_{qf}$	'0'	'0'	'0.891'	'0'	'0.2852'
$\delta$	'0'	'0.15'	'0.0163'	'0.15'	'0.1531'
$\eta_L$	'0'	'1'	'0.8684'	'0.988'	'0.1328'
$\vartheta_P$	'0'	'0.729'	'0.0007'	'0'	'0.109'
$\gamma_H$	'0.1933'	'1'	'0.5103'	'0.9999'	'0.1337'
$z$	'10.8395'	'21.7388'	'29.9087'	'19.0585'	'0.1678'
$\eta_{\vartheta}$	'0'	'0.0672'	'0.074'	'0.0299'	'0.189'
$a_L$	'8.1688'	'14.9929'	'8.4098'	'9.0098'	'0.1293'
$b_L$	'6.7388'	'15'	'14.9152'	'14.9992'	'0.1875'
$a_{\mu}$	'1.5698'	'15'	'8.4994'	'2.859'	'0.1679'
$b_{\mu}$	'1'	'15'	'11.301'	'7.5329'	'0.2156'
$\mu$	'0'	'1'	'0.7997'	'0.6412'	'0.2191'
$a_H$	'1'	'3.5672'	'9.2955'	'1.3498'	'0.1405'
$b_H$	'1'	'15'	'7.686'	'10.3395'	'0.1094'
$\nu$	'34.6353'	'88.425'	'195.2529'	'45.4554'	'0.2407'
BP	'269.4517'	'274.8323'	'269.5'	'269.5'	'0.0499'

### 8.3. Identifiability analysis

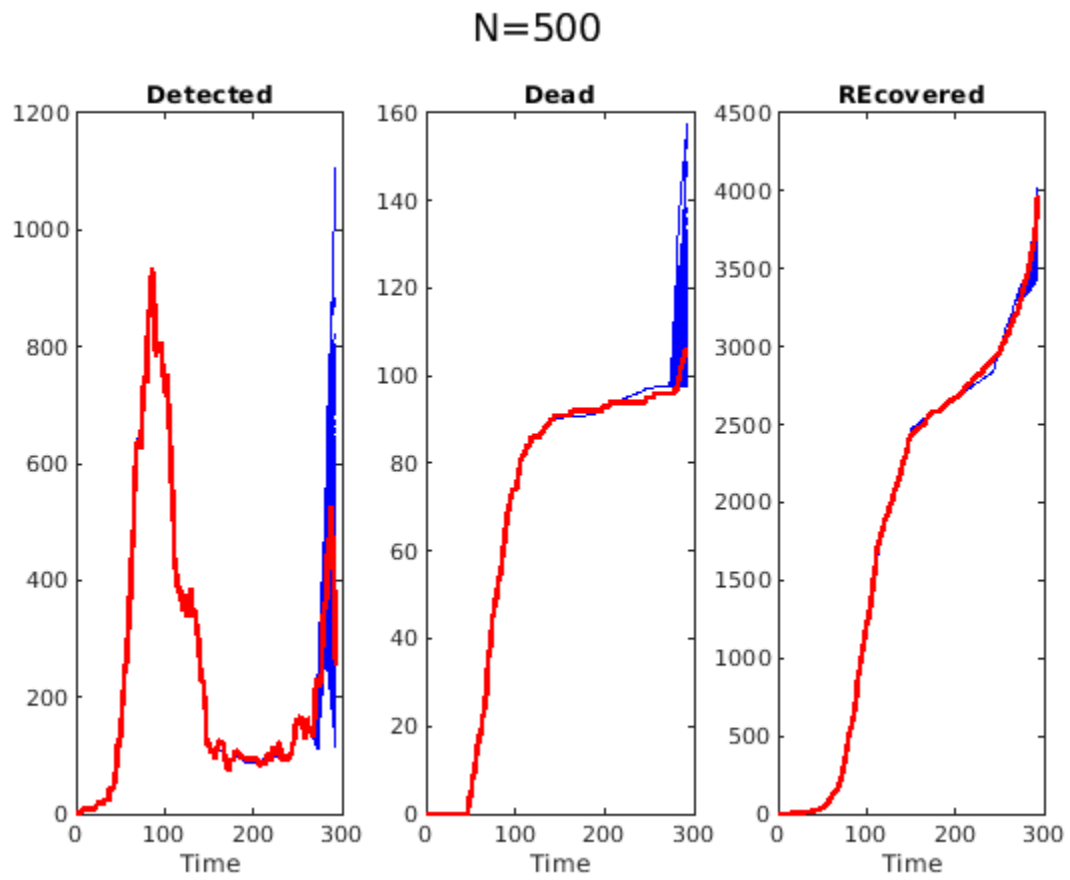








## 8.4. Uncertainty analysis



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## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data294 to the 310. The status of the validation is: COMPLETED.

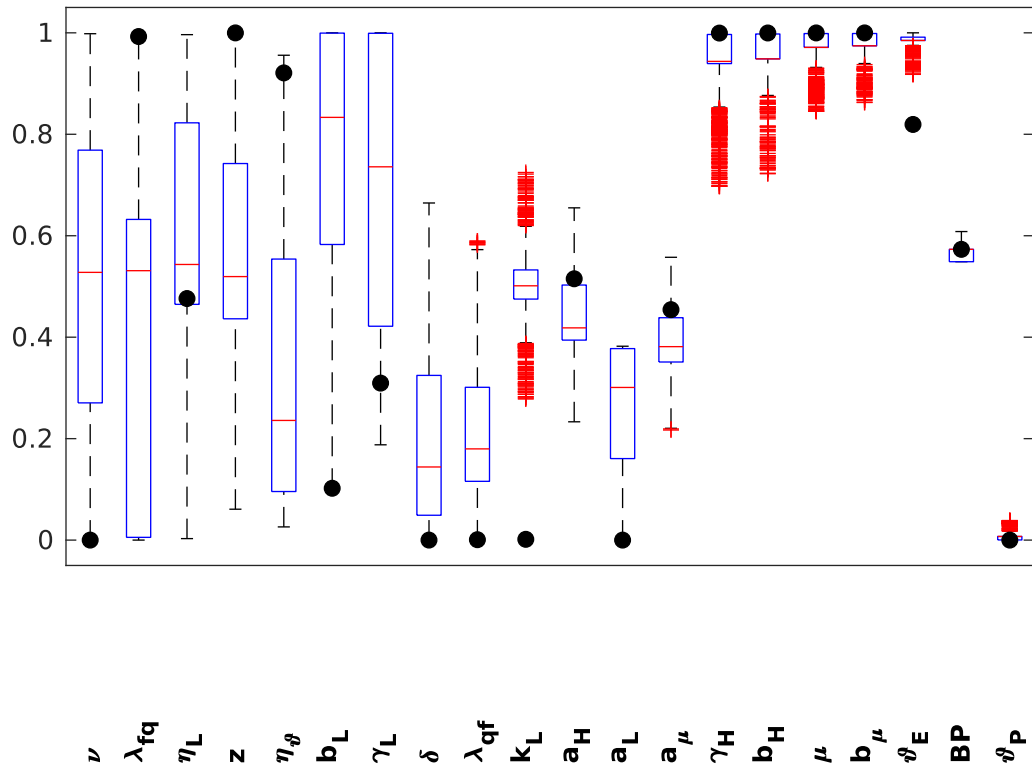
The number of estimations needed to perform the validation was1000.

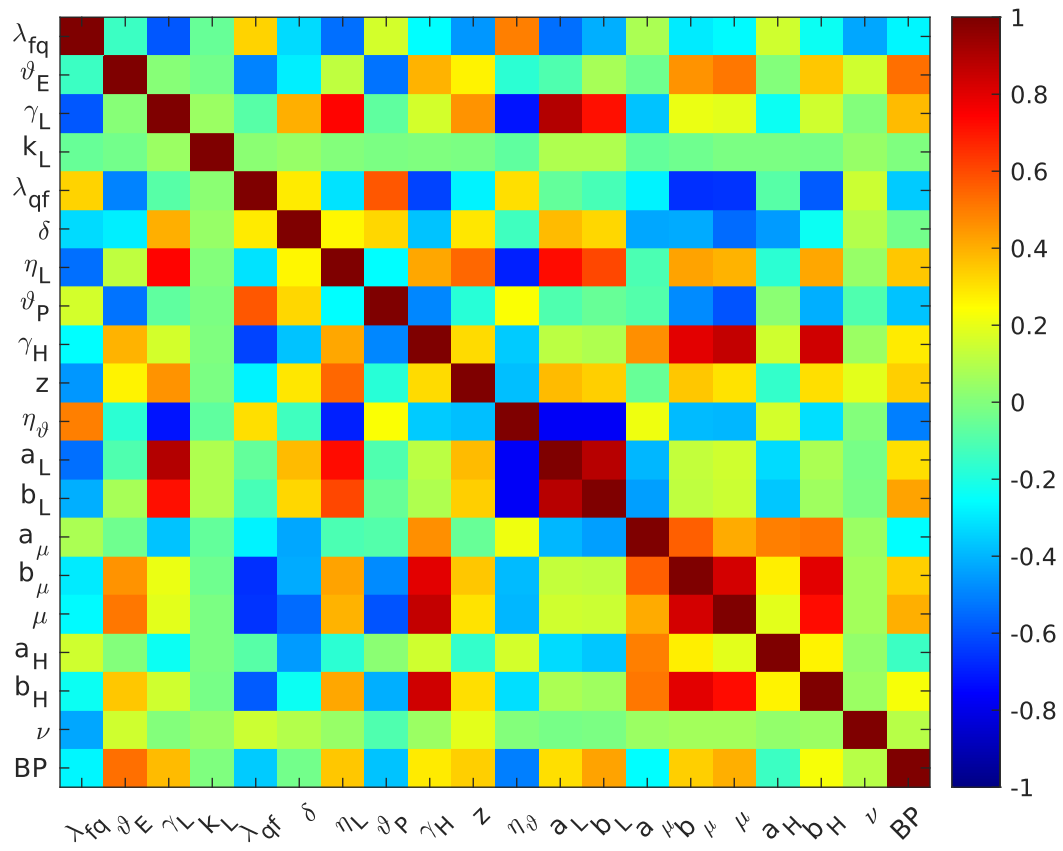
### 9.2. Estimated parameters with their intervals

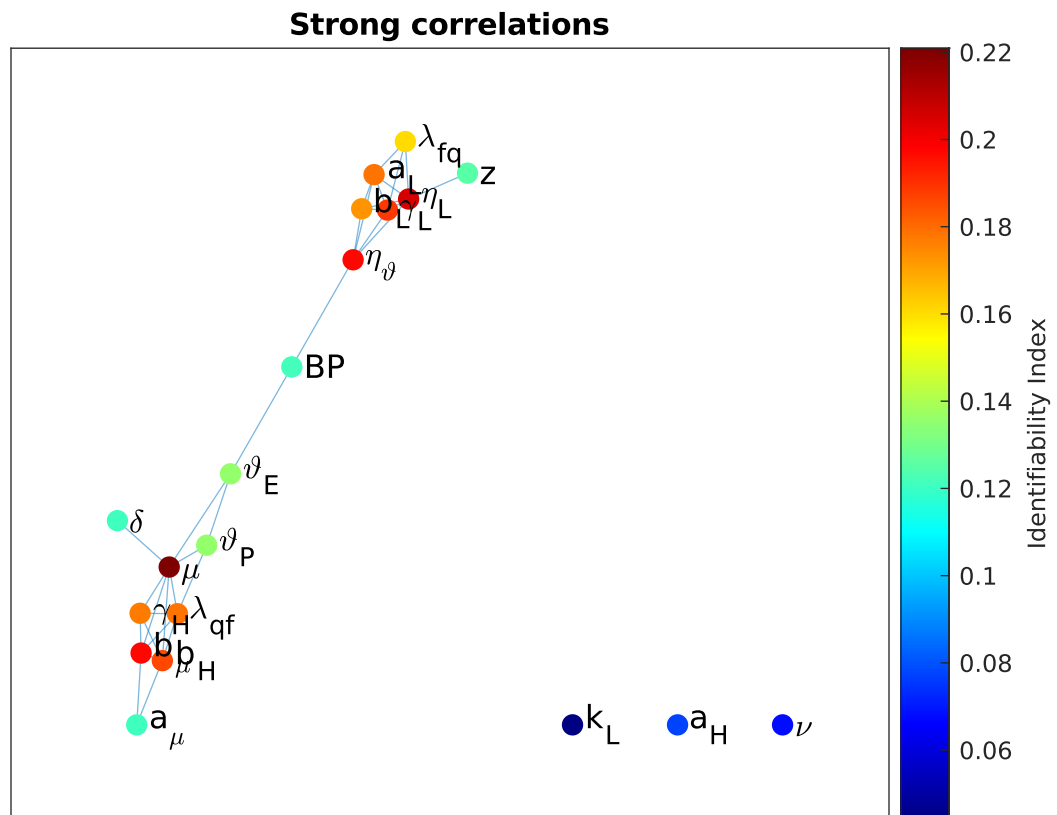
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.5073'	'0.5549'	'0.5311'	'0.9927'	'0.1609'
$\vartheta_E$	'0.9695'	'1'	'0.9849'	'0.8194'	'0.1359'
$\gamma_L$	'0.7149'	'0.7568'	'0.7359'	'0.3095'	'0.1887'
$k_L$	'5.4112'	'5.6123'	'5.5117'	'1.0139'	'0.0444'
$\lambda_{qf}$	'0.1666'	'0.193'	'0.1798'	'0.0008'	'0.1785'
$\delta$	'0.0196'	'0.0236'	'0.0216'	'0'	'0.121'
$\eta_L$	'0.5271'	'0.5596'	'0.5434'	'0.4762'	'0.2053'
$\vartheta_P$	'0'	'0.0206'	'0.0072'	'0'	'0.1357'
$\gamma_H$	'0.9296'	'0.9579'	'0.9437'	'0.9995'	'0.1774'
$z$	'15.0369'	'16.1315'	'15.5842'	'29.9958'	'0.1257'
$\eta_{\vartheta}$	'0.2146'	'0.2572'	'0.2359'	'0.921'	'0.1974'
$a_L$	'5.0658'	'5.3601'	'5.2129'	'1'	'0.1786'
$b_L$	'12.3464'	'12.9866'	'12.6665'	'2.4304'	'0.1732'
$a_{\mu}$	'6.2708'	'6.4071'	'6.339'	'7.3598'	'0.1211'
$b_{\mu}$	'14.4398'	'14.8436'	'14.6417'	'14.9976'	'0.1973'
$\mu$	'0.9584'	'0.9842'	'0.9713'	'0.9998'	'0.2209'
$a_H$	'6.7646'	'6.9498'	'6.8572'	'8.212'	'0.0778'
$b_H$	'14.0501'	'14.5121'	'14.2811'	'14.9957'	'0.1864'
$\nu$	'252.7762'	'275.0095'	'263.8929'	'0.0017'	'0.0679'
BP	'292.4442'	'292.5558'	'292.5'	'292.5'	'0.1217'

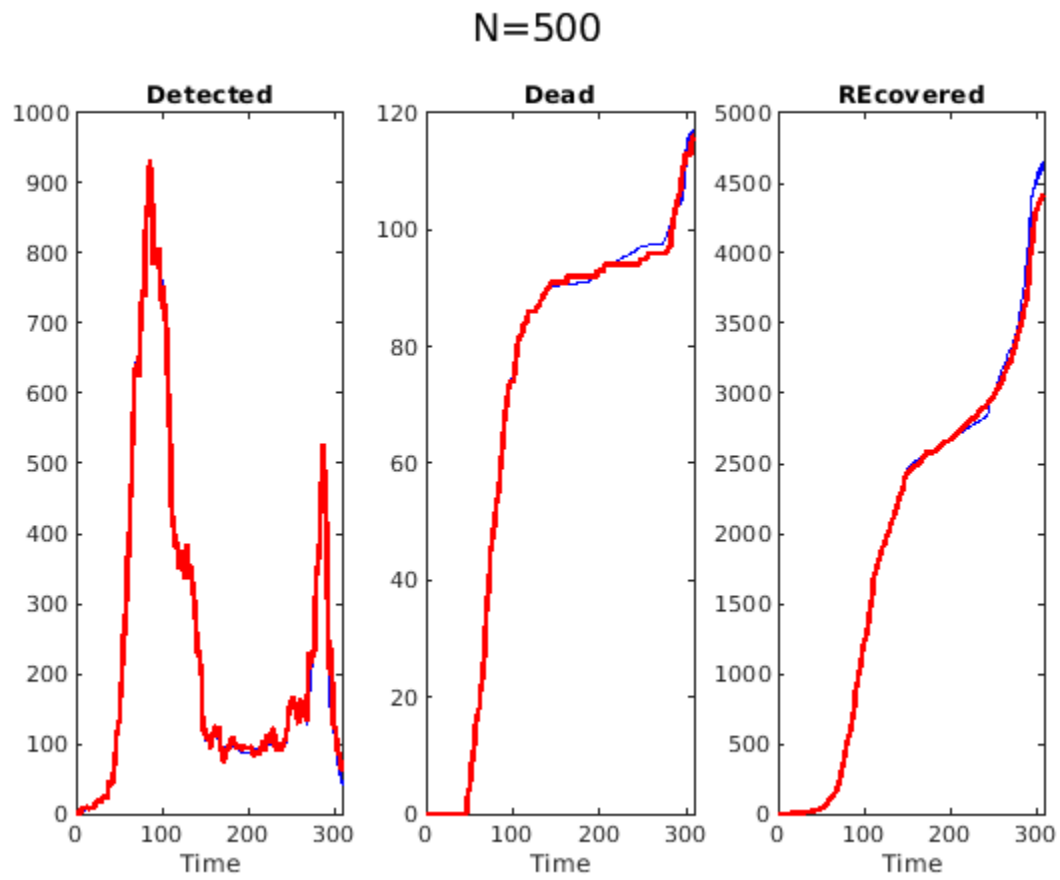
### 9.3. Identifiability analysis







## 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 data310 to the 325. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

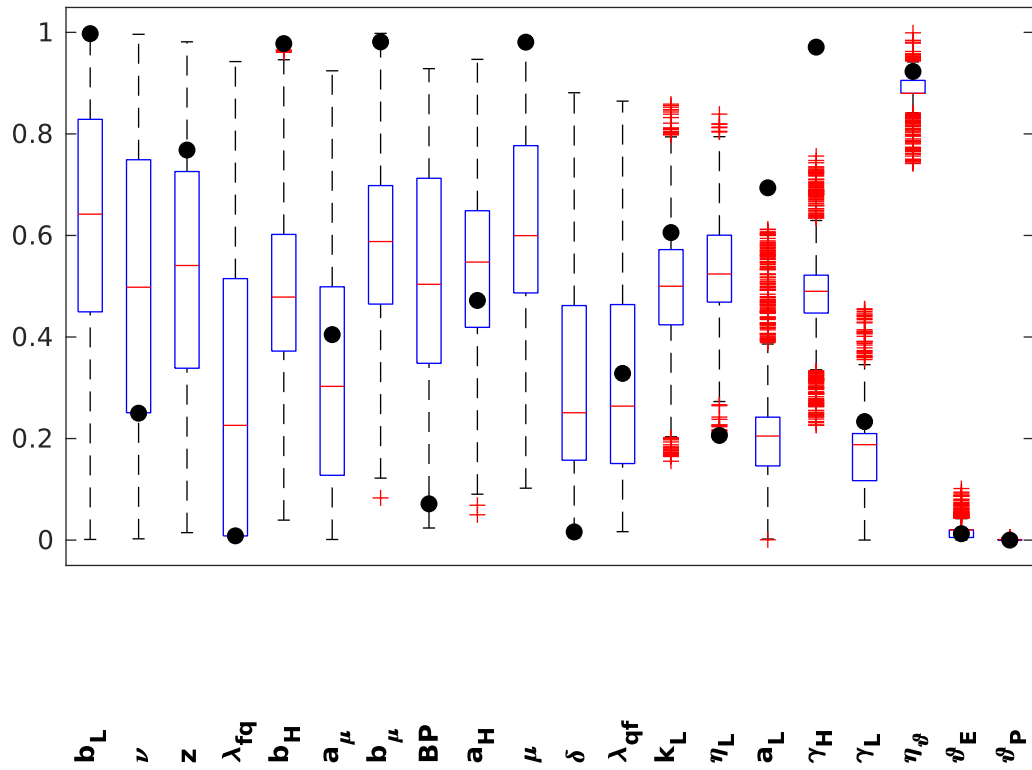
### 10.2. Estimated parameters with their intervals

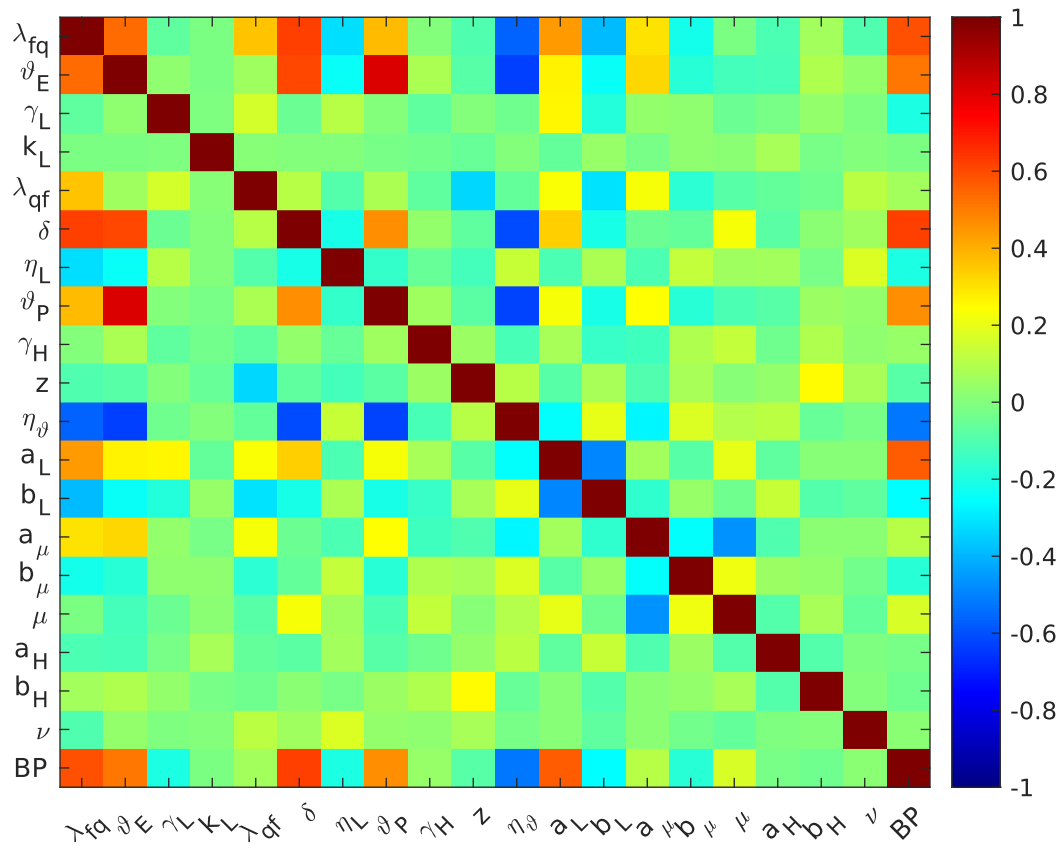
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

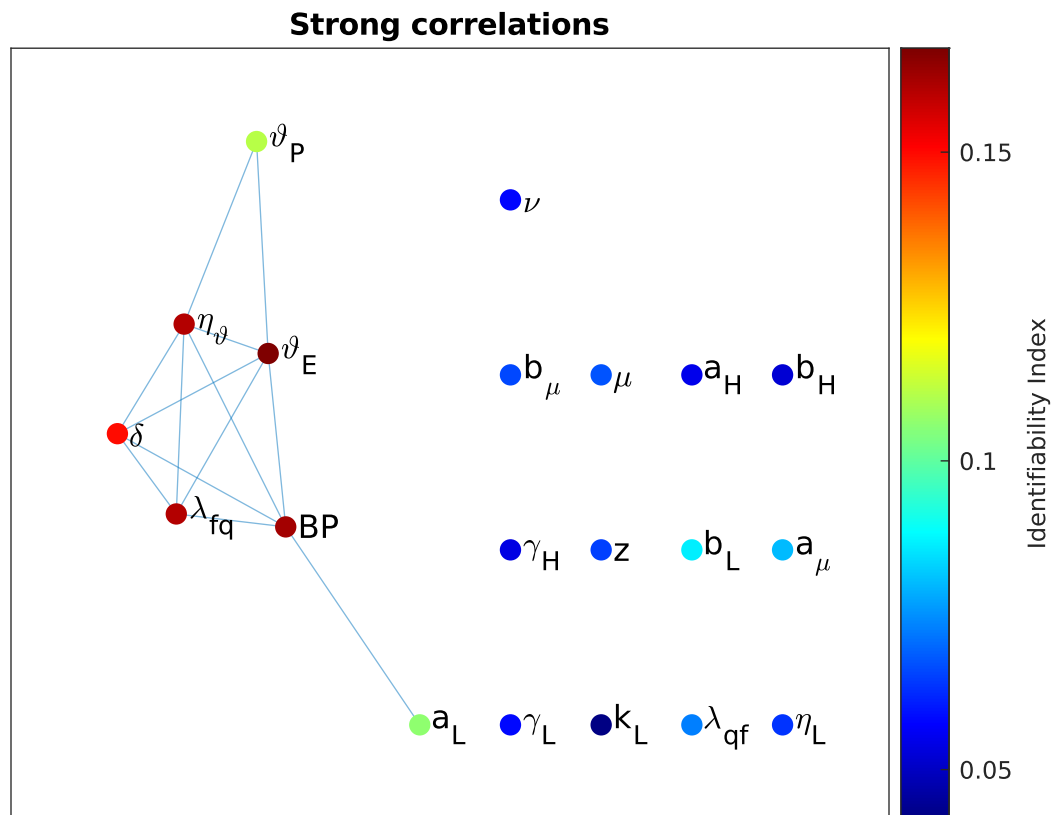
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0005'	'0.018'	'0.226'	'0.0084'	'0.1603'
$\vartheta_E$	'0.008'	'0.0172'	'0.0201'	'0.0126'	'0.1668'
$\gamma_L$	'0.2041'	'0.2862'	'0.188'	'0.2334'	'0.0587'
$k_L$	'1.621'	'9.5811'	'5.5001'	'6.4513'	'0.0421'
$\lambda_{qf}$	'0.3262'	'0.8424'	'0.2639'	'0.3283'	'0.073'
$\delta$	'0'	'0.005'	'0.0376'	'0.0024'	'0.1495'
$\eta_L$	'0.0764'	'0.4175'	'0.5241'	'0.2062'	'0.064'
$\vartheta_P$	'0'	'0'	'0.001'	'0'	'0.1112'
$\gamma_H$	'0.02'	'1'	'0.49'	'0.9709'	'0.0538'
$z$	'15.0338'	'29.3777'	'16.2249'	'23.0483'	'0.0651'
$\eta_{\vartheta}$	'0.6065'	'0.9839'	'0.8799'	'0.923'	'0.1603'
$a_L$	'9.2015'	'10.8155'	'3.8688'	'10.714'	'0.1062'
$b_L$	'11.8294'	'15'	'9.9878'	'14.9649'	'0.0866'
$a_{\mu}$	'1.35'	'15'	'5.2394'	'6.6663'	'0.0805'
$b_{\mu}$	'1.5544'	'15'	'9.2323'	'14.7383'	'0.066'
$\mu$	'0.02'	'1'	'0.5997'	'0.9807'	'0.0676'
$a_H$	'1.5607'	'13.1184'	'8.6665'	'7.6077'	'0.0549'
$b_H$	'2.4'	'15'	'7.7009'	'14.6901'	'0.0519'
$\nu$	'116.1618'	'221.0877'	'249.0353'	'124.9767'	'0.058'
BP	'294.6997'	'307.377'	'304.5805'	'295.5'	'0.1622'

### 10.3. Identifiability analysis

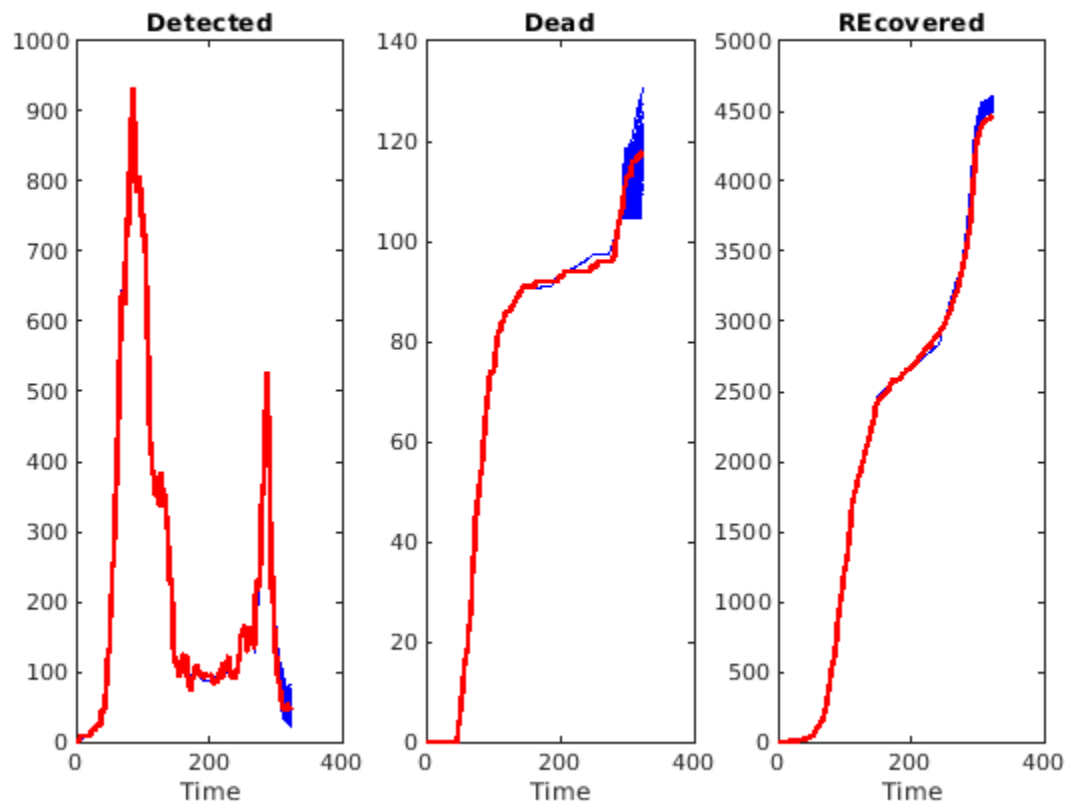






## 10.4. Uncertainty analysis

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 data325 to the 378. The status of the validation is: COMPLETED.

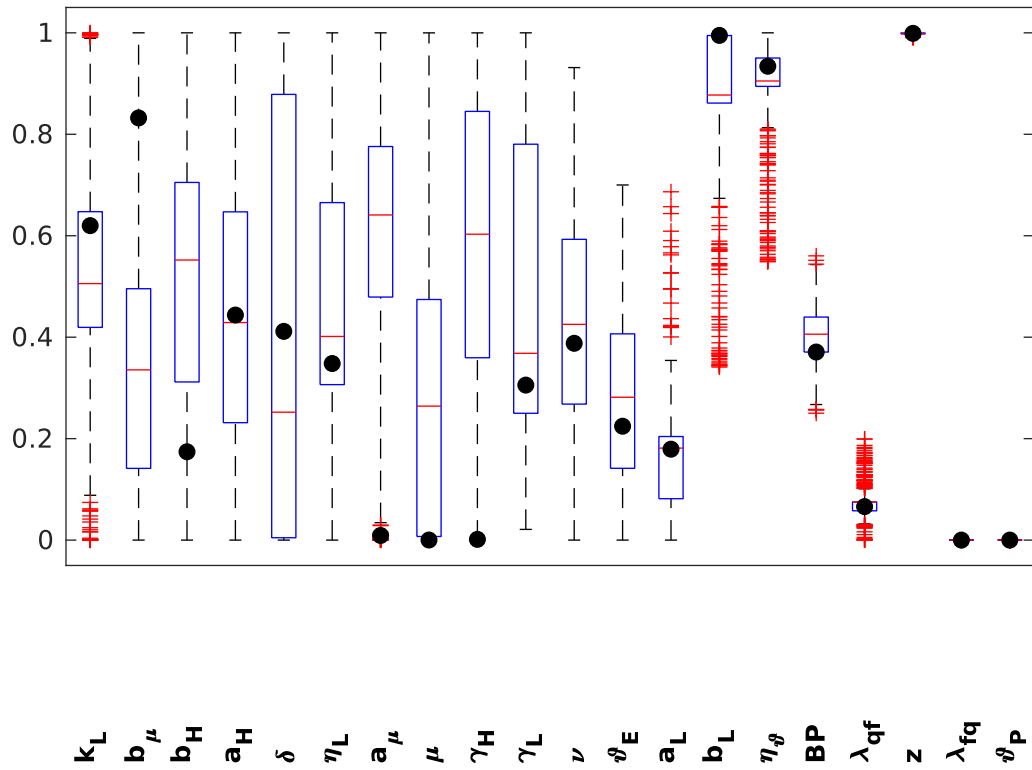
The number of estimations needed to perform the validation was1000.

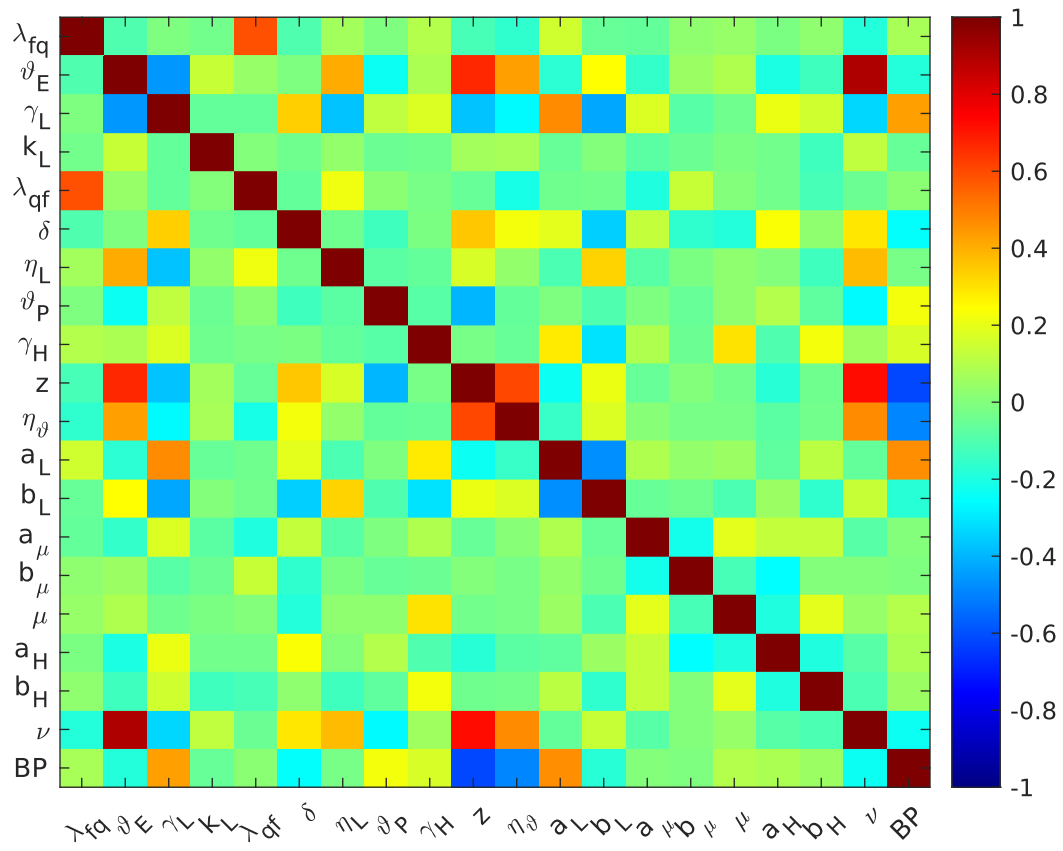
### 11.2. Estimated parameters with their intervals

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

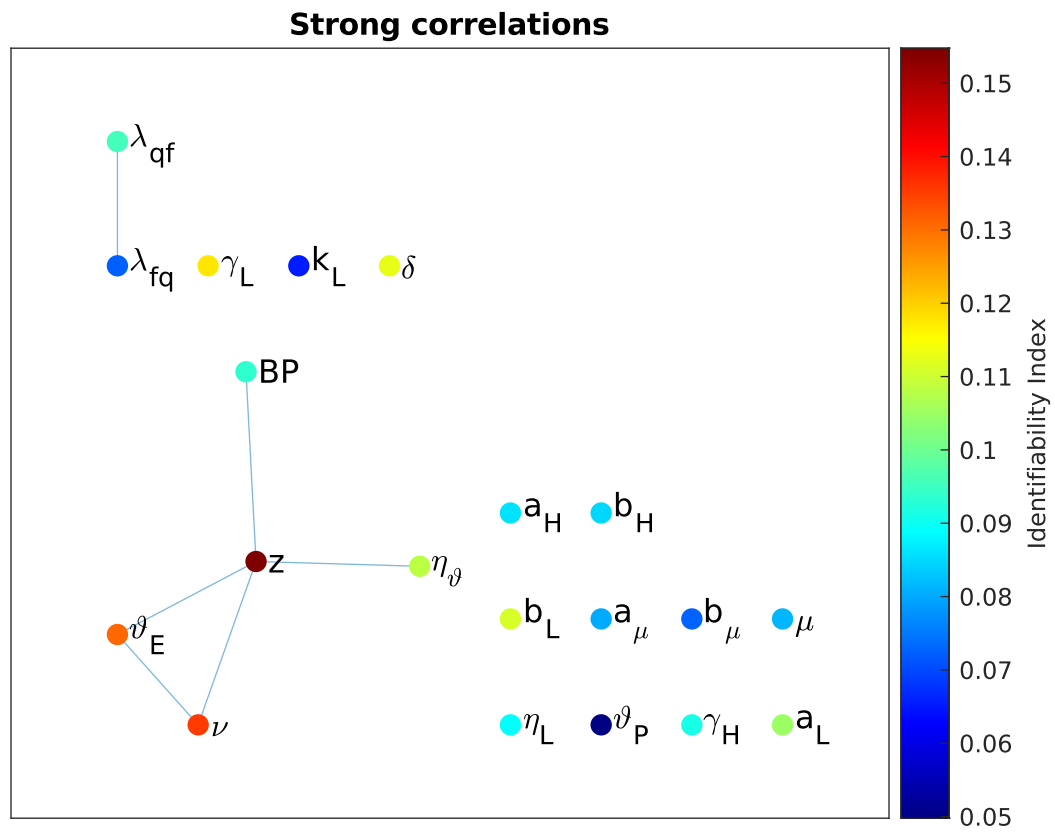
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0229'	'0'	'0'	'0.0727'
\vartheta_E	'0.2593'	'0.304'	'0.2816'	'0.2245'	'0.1308'
\gamma_L	'0.3321'	'0.4043'	'0.3682'	'0.3056'	'0.1178'
k_L	'5.2984'	'5.803'	'5.5507'	'6.5792'	'0.0657'
\lambda_{qf}	'0.0397'	'0.1103'	'0.075'	'0.066'	'0.0959'
\delta	'0.0305'	'0.0452'	'0.0378'	'0.0617'	'0.1129'
\eta_L	'0.3691'	'0.4338'	'0.4015'	'0.3481'	'0.0895'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0498'
\gamma_H	'0.5644'	'0.6417'	'0.603'	'0.0015'	'0.0913'
z	'28.8728'	'30'	'29.9434'	'29.9681'	'0.1548'
\eta_{\vartheta}	'0.8787'	'0.9314'	'0.9051'	'0.9341'	'0.1083'
a_L	'2.9841'	'4.0938'	'3.5389'	'3.509'	'0.1048'
b_L	'12.6766'	'13.8902'	'13.2834'	'14.9293'	'0.111'
a_{\mu}	'9.53'	'10.4167'	'9.9734'	'1.1273'	'0.0805'
b_{\mu}	'5.2556'	'6.1406'	'5.6981'	'12.6514'	'0.0728'
\mu	'0.2295'	'0.2988'	'0.2641'	'0.0002'	'0.0815'
a_H	'6.5305'	'7.4776'	'7.004'	'7.211'	'0.0863'
b_H	'8.2439'	'9.2154'	'8.7296'	'3.4379'	'0.0848'
\nu	'198.2846'	'227.0011'	'212.6429'	'193.9648'	'0.1352'
BP	'332.9077'	'334.1764'	'333.542'	'331.5026'	'0.0938'

### 11.3. Identifiability analysis

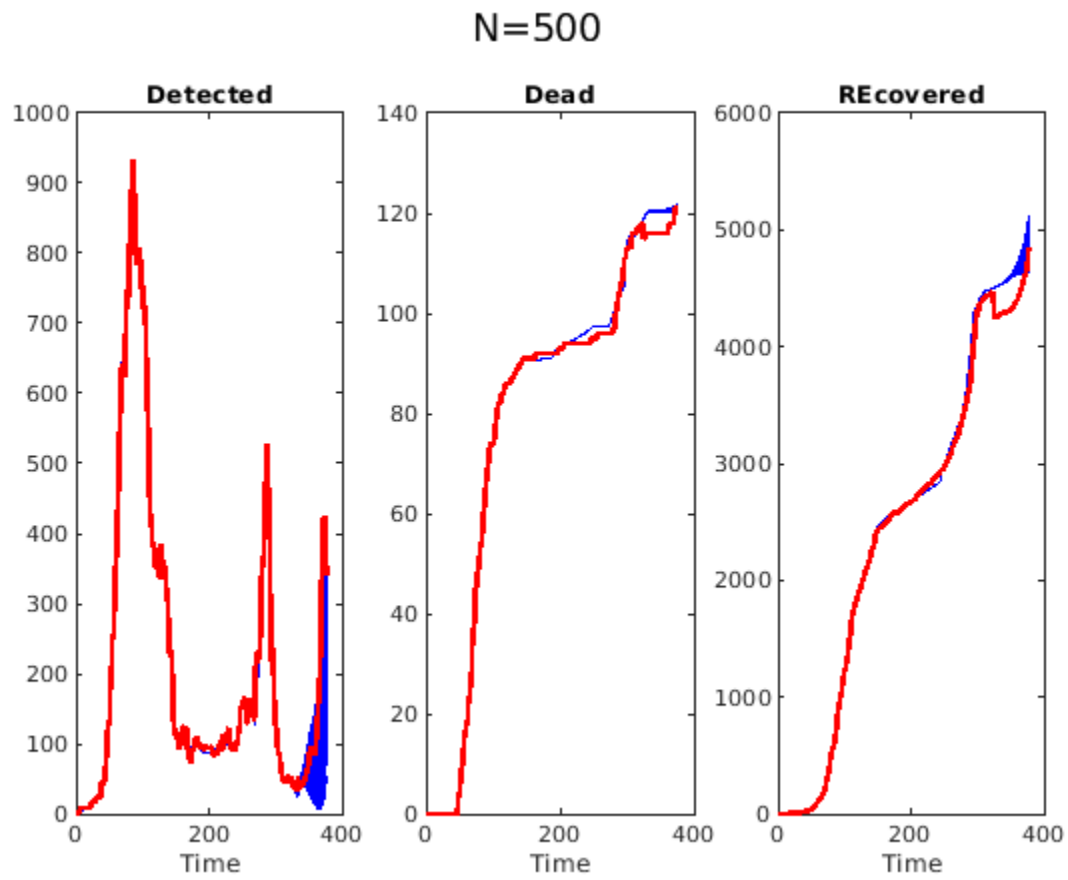








## 11.4. Uncertainty analysys



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## Chapter 12. Extension number12

### 12.1. Basic information

The extension to be validated consists of the time series from the data378 to the 378. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

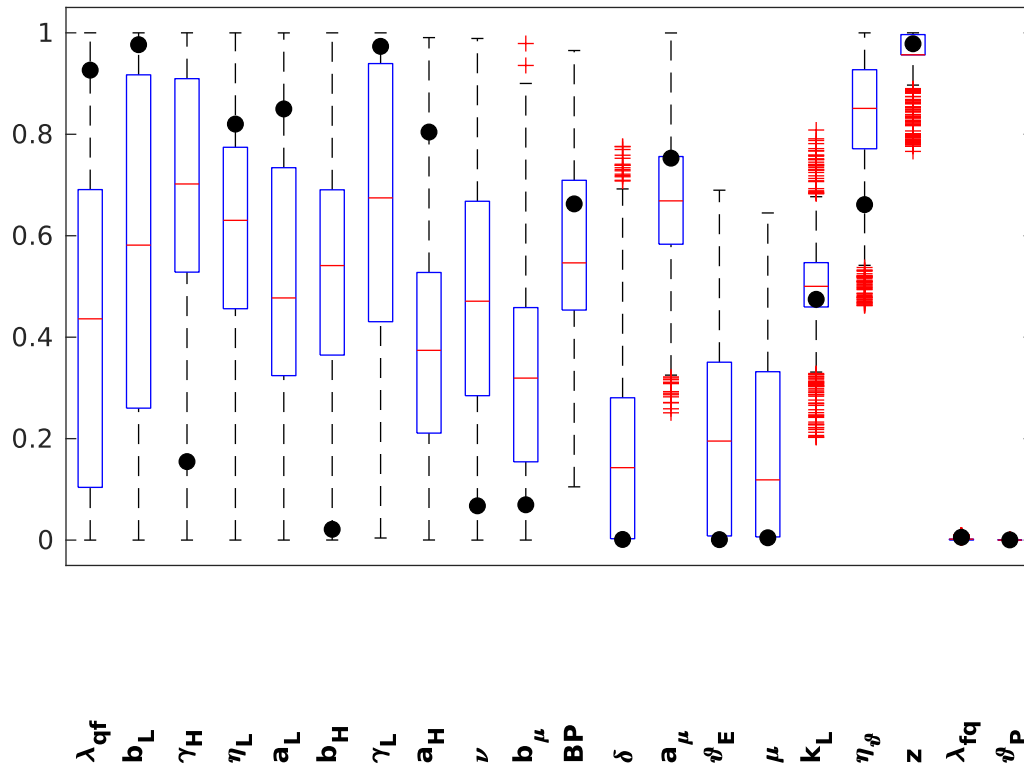
### 12.2. Estimated parameters with their intervals

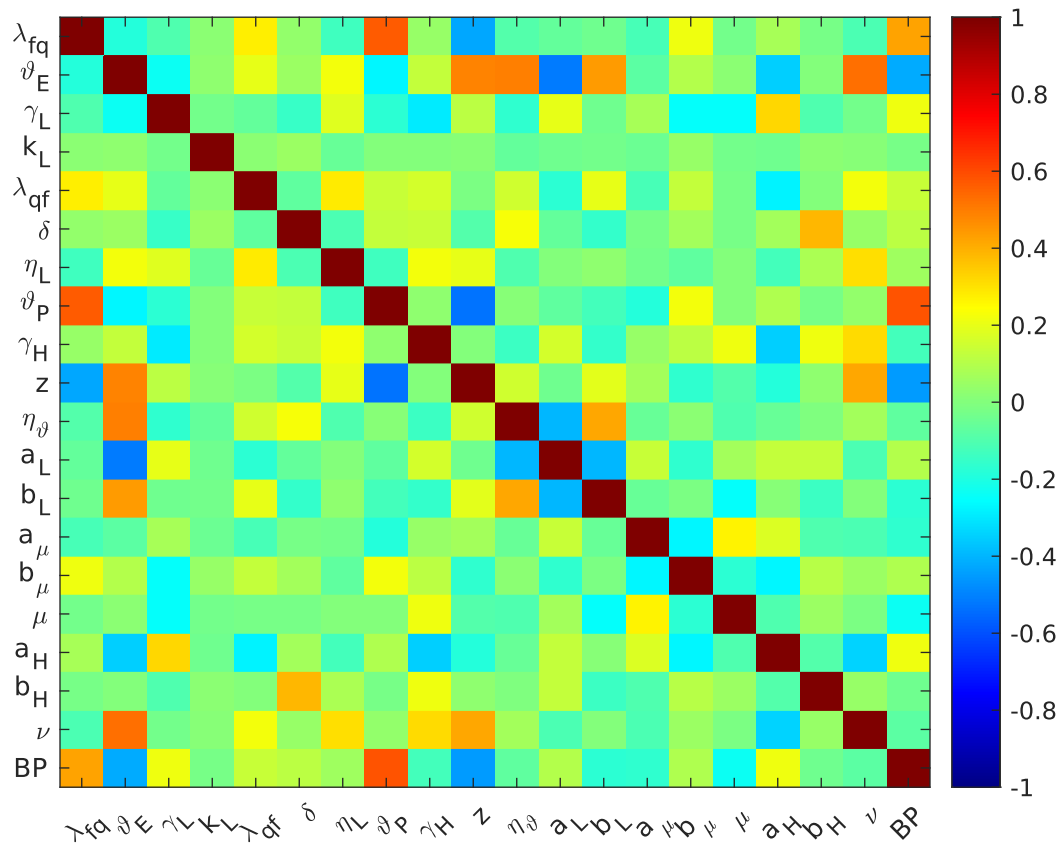
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

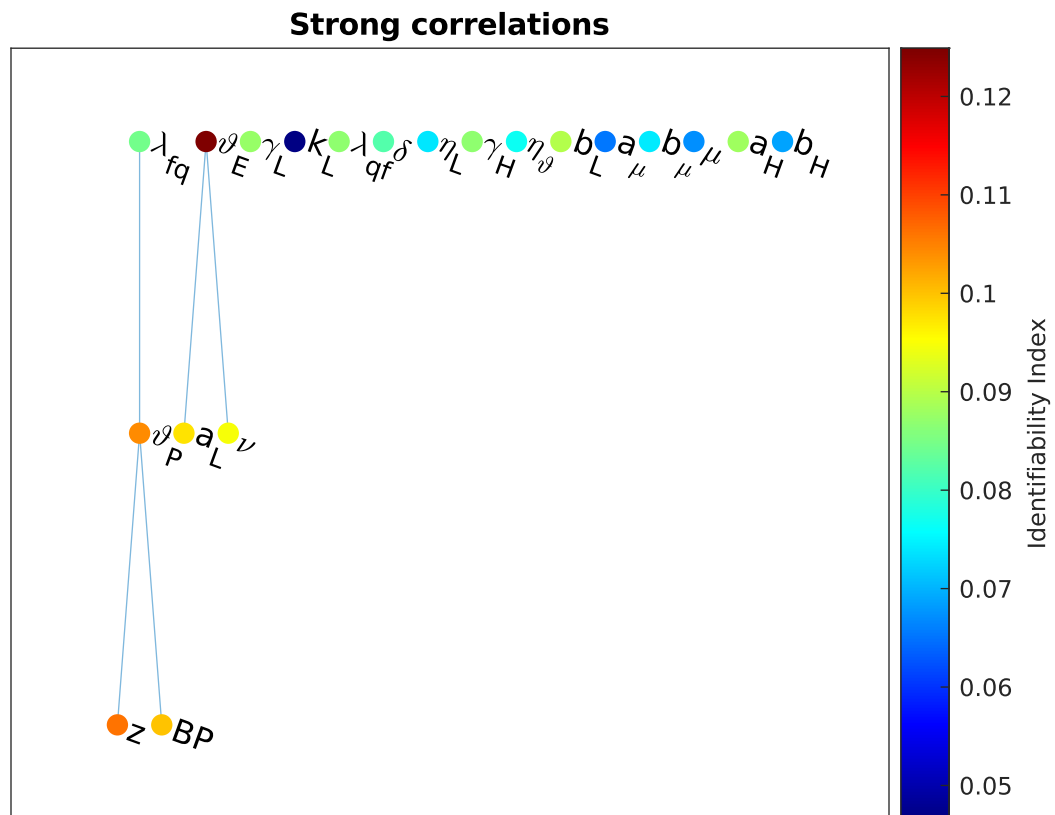
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0056'	'0.0056'	'0.0019'	'0.0056'	'0.0848'
$\vartheta_E$	'0.0006'	'0.0014'	'0.1952'	'0.0009'	'0.1249'
$\gamma_L$	'0.6813'	'1'	'0.6746'	'0.9733'	'0.0874'
$k_L$	'3.6902'	'7.9075'	'5.5023'	'5.2717'	'0.0467'
$\lambda_{qf}$	'0.6485'	'1'	'0.4362'	'0.9264'	'0.087'
$\delta$	'0.0001'	'0.0003'	'0.0214'	'0.0002'	'0.0823'
$\eta_L$	'0.5741'	'1'	'0.6303'	'0.8201'	'0.0742'
$\vartheta_P$	'0.0003'	'0.0006'	'0.0001'	'0.0004'	'0.1043'
$\gamma_H$	'0.1083'	'0.2321'	'0.7021'	'0.1547'	'0.087'
$z$	'20.5476'	'30'	'28.6965'	'29.3537'	'0.1062'
$\eta_{\vartheta}$	'0.4629'	'0.992'	'0.8507'	'0.6613'	'0.0768'
$a_L$	'9.0297'	'15'	'7.6833'	'12.8995'	'0.0977'
$b_L$	'10.271'	'15'	'9.1409'	'14.6728'	'0.0897'
$a_{\mu}$	'8.0787'	'15'	'10.3611'	'11.541'	'0.0656'
$b_{\mu}$	'1.3823'	'2.9622'	'5.4719'	'1.9748'	'0.0742'
$\mu$	'0.0032'	'0.0069'	'0.1189'	'0.0046'	'0.0674'
$a_H$	'8.5833'	'15'	'6.2371'	'12.2618'	'0.088'
$b_H$	'1'	'1.9466'	'8.5764'	'1.2978'	'0.0689'
$\nu$	'23.6523'	'50.6836'	'235.4684'	'33.7891'	'0.0948'
BP	'325'	'368'	'348.5'	'353.5'	'0.0999'

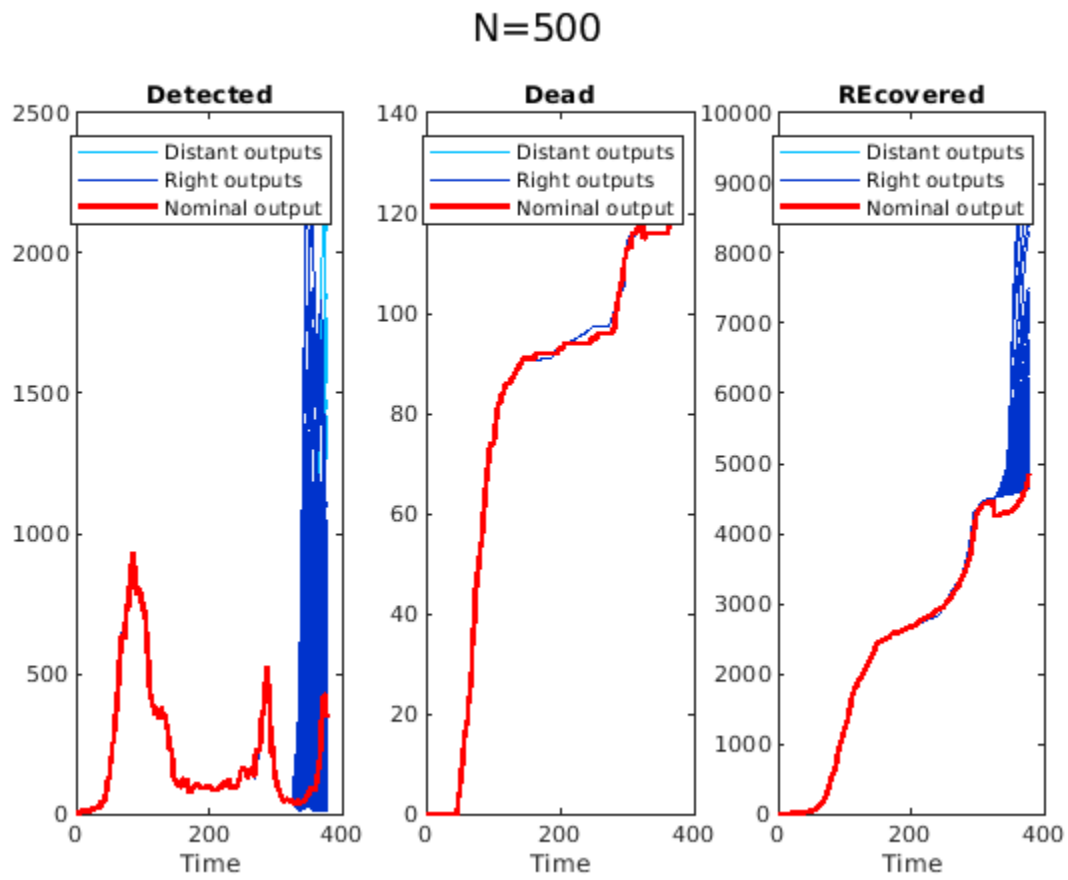
### 12.3. Identifiability analysis







## 12.4. Uncertainty analysys



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## Chapter 13. Extension number13

### 13.1. Basic information

The extension to be validated consists of the time series from the data378 to the 408. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was33000.

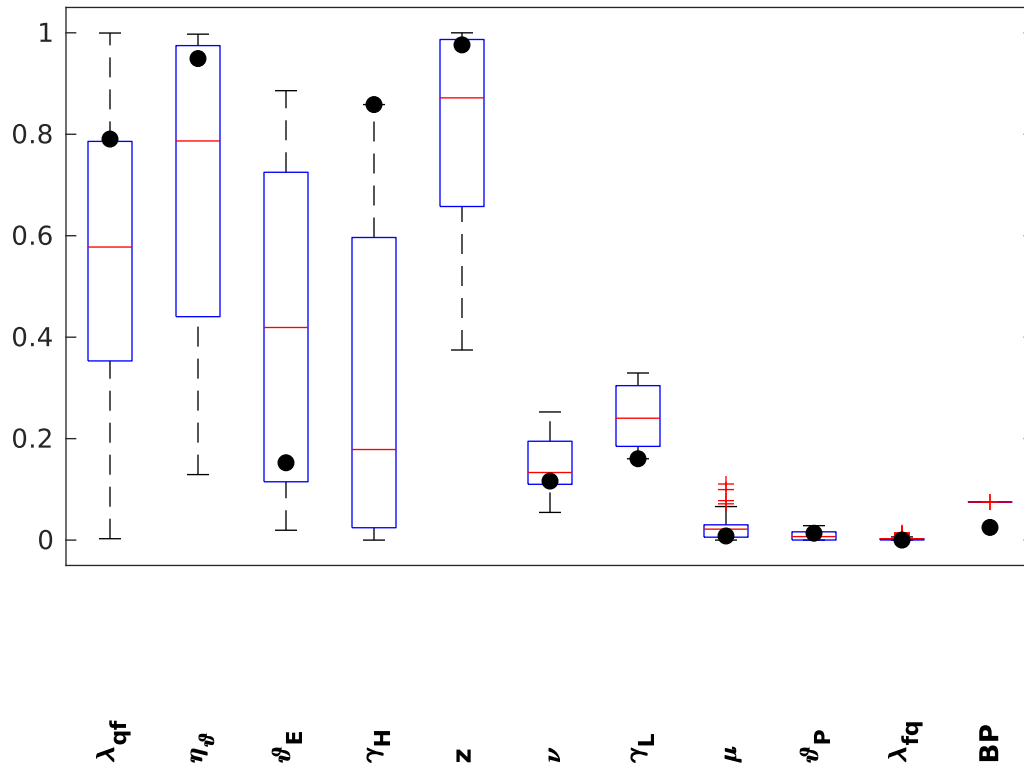
### 13.2. Estimated parameters with their intervals

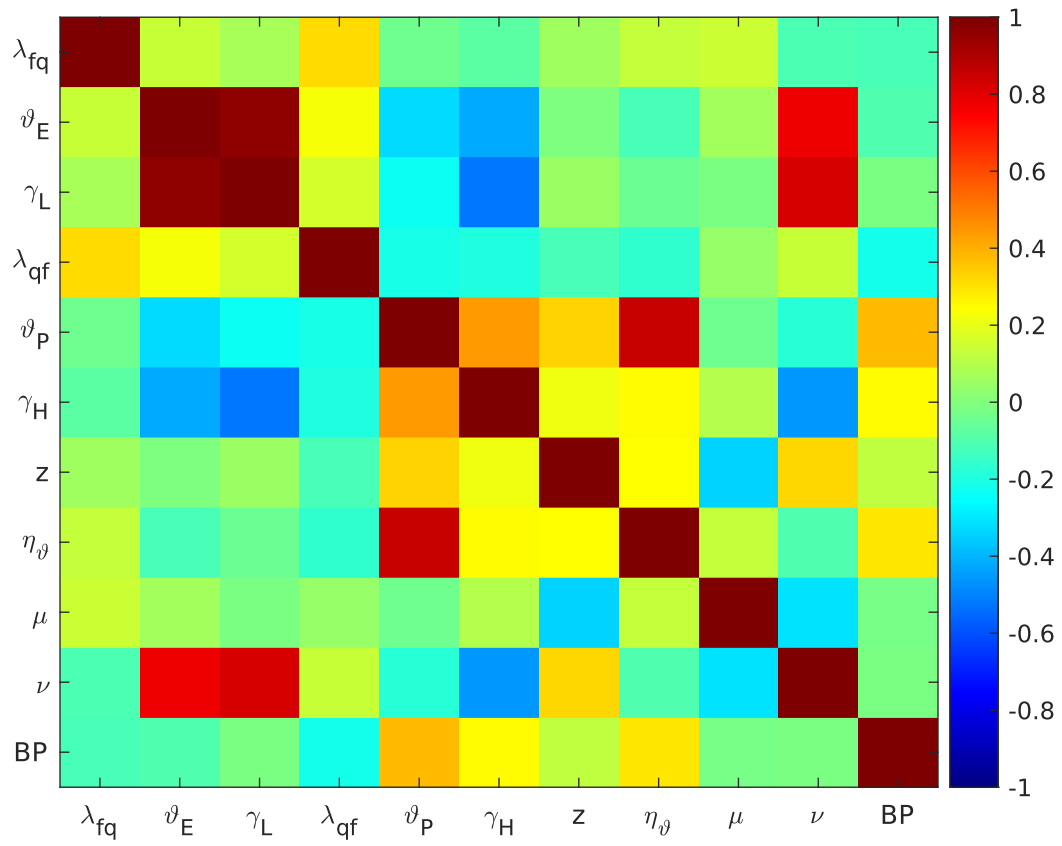
It was necessary to fix 9 parameters of 10 that could be fixed to complete validation.

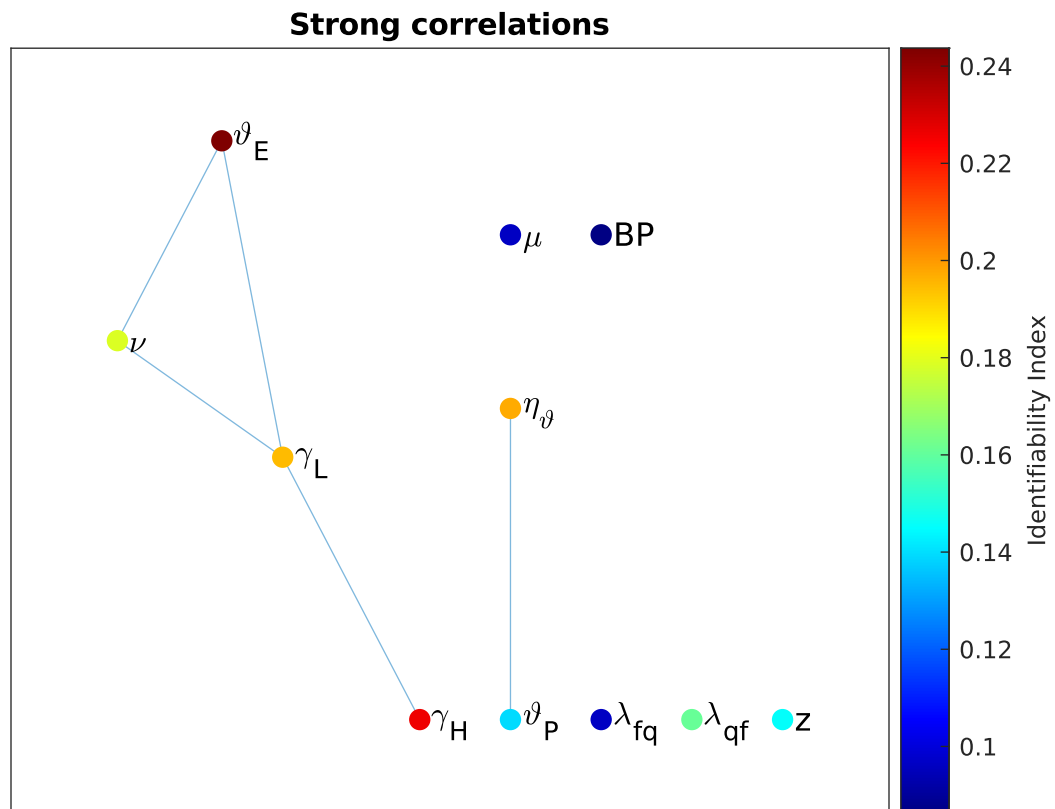
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0477'	'0.0028'	'0.0001'	'0.0965'
$\vartheta_E$	'0.3376'	'0.5006'	'0.4191'	'0.1525'	'0.2437'
$\gamma_L$	'0.2244'	'0.2562'	'0.2403'	'0.1604'	'0.195'
$k_L$	'5.4467'	'5.4467'	'5.4467'	'5.4467'	'0'
$\lambda_{qf}$	'0.5023'	'0.653'	'0.5777'	'0.7905'	'0.1611'
$\delta$	'0.127'	'0.127'	'0.127'	'0.127'	'0'
$\eta_L$	'0.6662'	'0.6662'	'0.6662'	'0.6662'	'0'
$\vartheta_P$	'0.0044'	'0.0095'	'0.0069'	'0.0136'	'0.1395'
$\gamma_H$	'0.087'	'0.2701'	'0.1786'	'0.8585'	'0.2263'
$z$	'24.3722'	'27.933'	'26.1526'	'29.2863'	'0.1459'
$\eta_{\vartheta}$	'0.7105'	'0.8631'	'0.7868'	'0.9492'	'0.1971'
$a_L$	'1.9376'	'1.9376'	'1.9376'	'1.9376'	'0'
$b_L$	'3.4193'	'3.4193'	'3.4193'	'3.4193'	'0'
$a_{\mu}$	'9.4233'	'9.4233'	'9.4233'	'9.4233'	'0'
$b_{\mu}$	'8.2332'	'8.2332'	'8.2332'	'8.2332'	'0'
$\mu$	'0'	'0.0482'	'0.0216'	'0.0081'	'0.0965'
$a_H$	'4.2022'	'4.2022'	'4.2022'	'4.2022'	'0'
$b_H$	'10.9199'	'10.9199'	'10.9199'	'10.9199'	'0'
$\nu$	'59.2697'	'73.9722'	'66.6209'	'58.1922'	'0.1787'
BP	'379.3645'	'379.6355'	'379.5'	'378.5'	'0.0865'



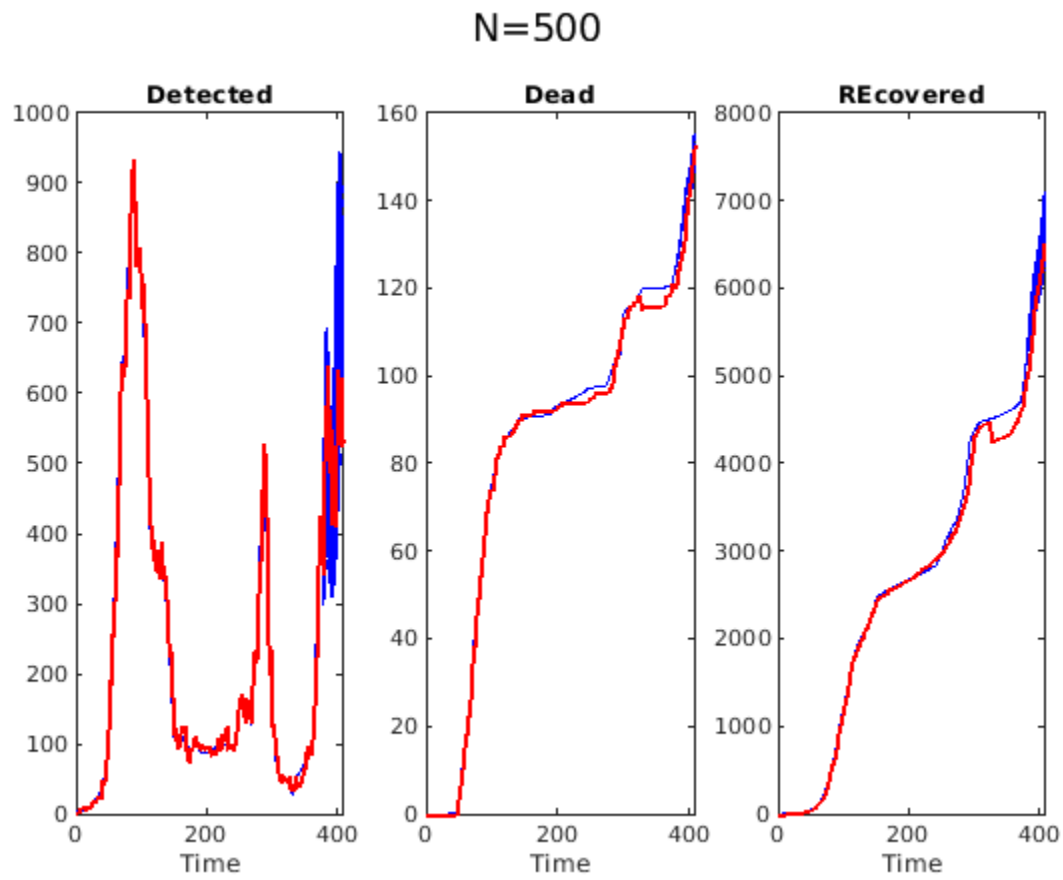
### 13.3. Identifiability analysis







### 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 data408 to the 429. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

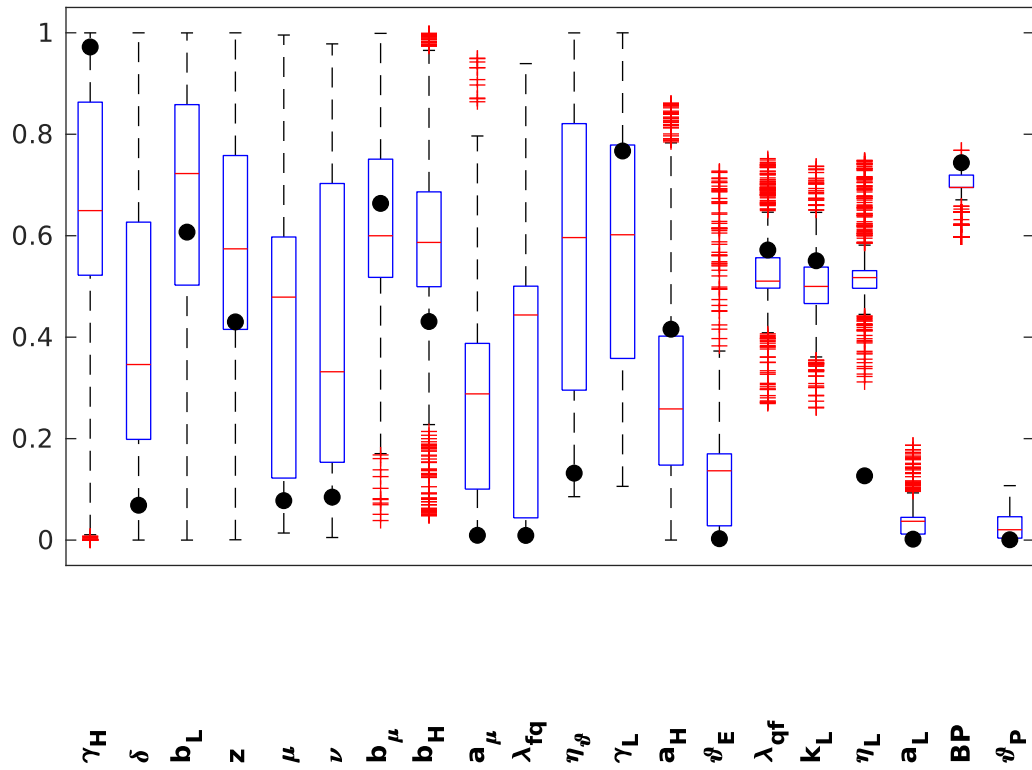
### 14.2. Estimated parameters with their intervals

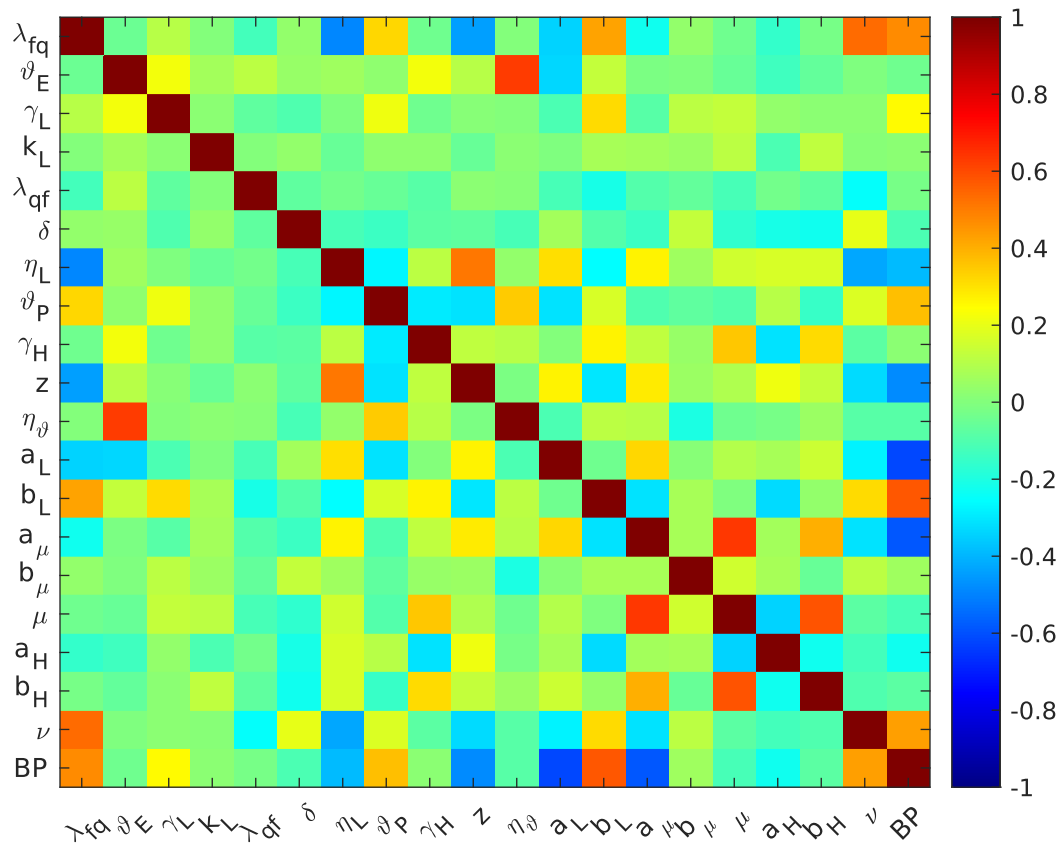
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

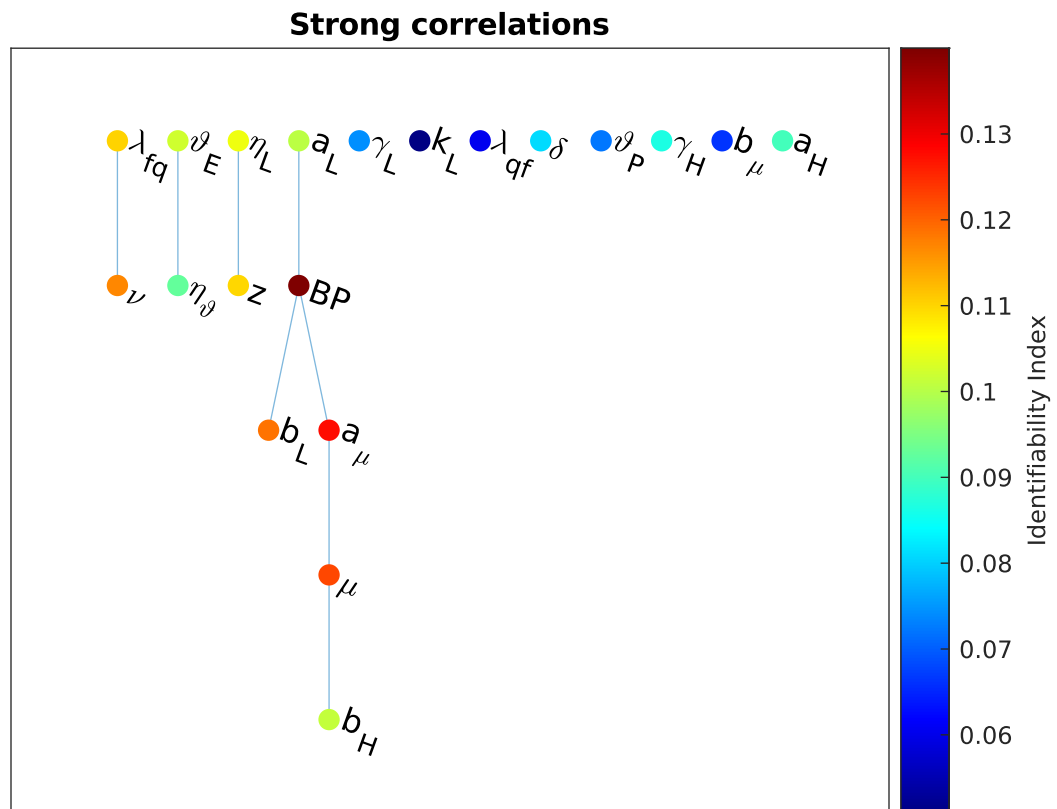
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0004'	'0.0207'	'0.4442'	'0.0092'	'0.1103'
$\vartheta_E$	'0'	'0.0062'	'0.1368'	'0.0028'	'0.1022'
$\gamma_L$	'0.6743'	'1'	'0.6019'	'0.767'	'0.0746'
$k_L$	'1'	'10'	'5.5003'	'5.9559'	'0.051'
$\lambda_{qf}$	'0'	'1'	'0.5105'	'0.5719'	'0.0606'
$\delta$	'0.0005'	'0.0232'	'0.0519'	'0.0103'	'0.0811'
$\eta_L$	'0'	'0.2851'	'0.5174'	'0.1267'	'0.1049'
$\vartheta_P$	'0'	'0.4713'	'0.0205'	'0.0007'	'0.0725'
$\gamma_H$	'0.1'	'1'	'0.6495'	'0.9721'	'0.0865'
$z$	'0'	'29.0337'	'17.2239'	'12.9039'	'0.1098'
$\eta_{\vartheta}$	'0'	'0.285'	'0.5963'	'0.1319'	'0.0928'
$a_L$	'1.0214'	'1.4287'	'1.5196'	'1.0258'	'0.1005'
$b_L$	'8.5579'	'13.3686'	'11.1155'	'9.4992'	'0.1185'
$a_{\mu}$	'1'	'12.34'	'5.0387'	'1.1326'	'0.1276'
$b_{\mu}$	'1'	'15'	'9.3961'	'10.292'	'0.0666'
$\mu$	'0'	'0.1516'	'0.479'	'0.0778'	'0.1224'
$a_H$	'1.35'	'15'	'4.6231'	'6.8201'	'0.09'
$b_H$	'1'	'14.3'	'9.2142'	'7.0324'	'0.1014'
$\nu$	'33.1448'	'453.5467'	'165.9161'	'42.3474'	'0.1168'
BP	'404.3013'	'408.6283'	'406.5'	'408.5'	'0.14'

## 14.3. Identifiability analysis



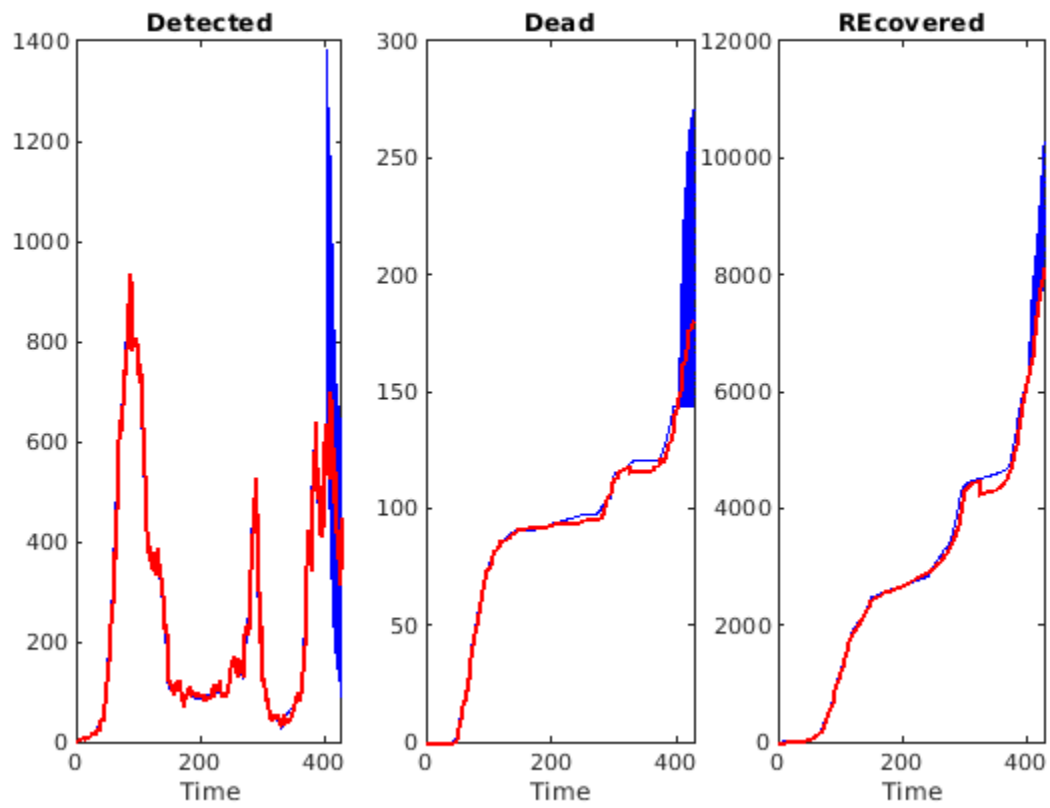






## 14.4. Uncertainty analysys

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 data429 to the 457. The status of the validation is: COMPLETED.

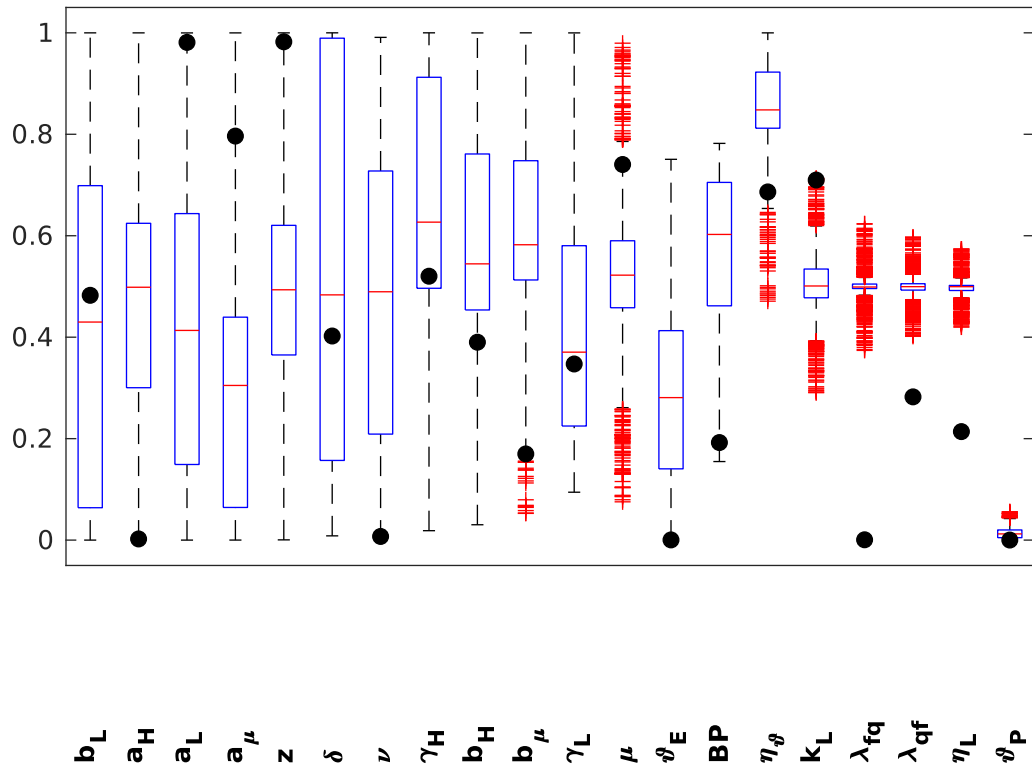
The number of estimations needed to perform the validation was1000.

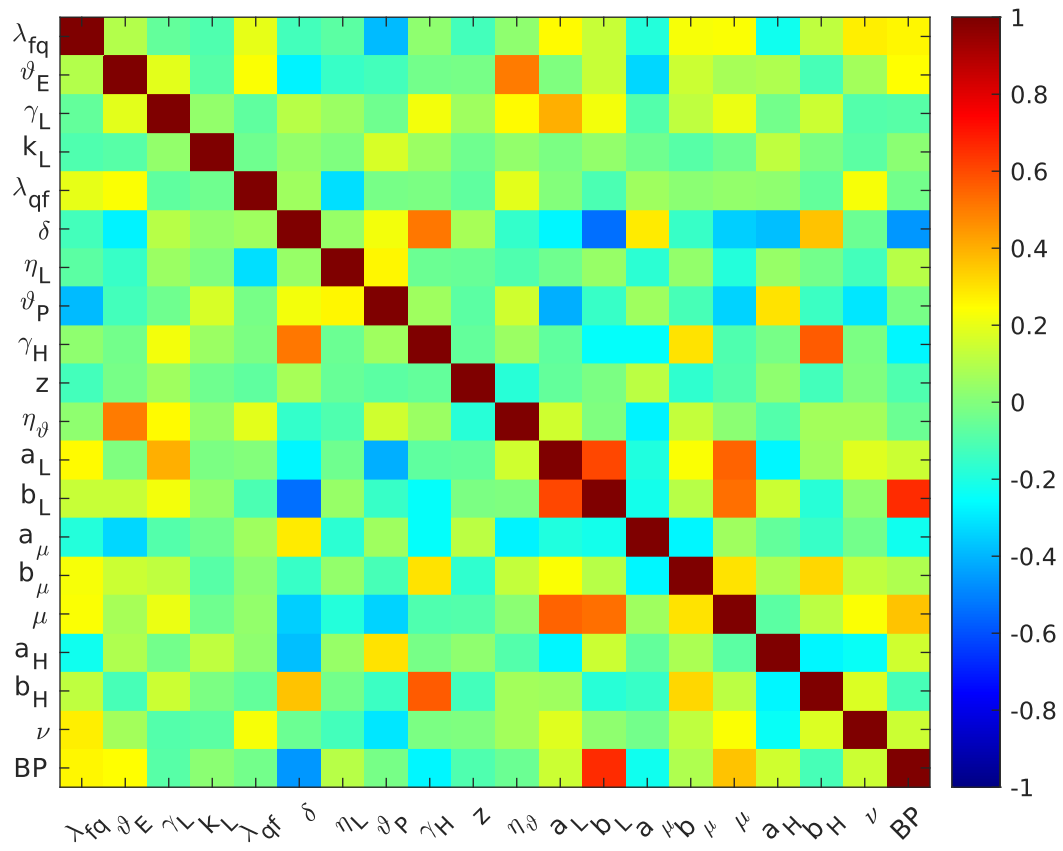
### 15.2. Estimated parameters with their intervals

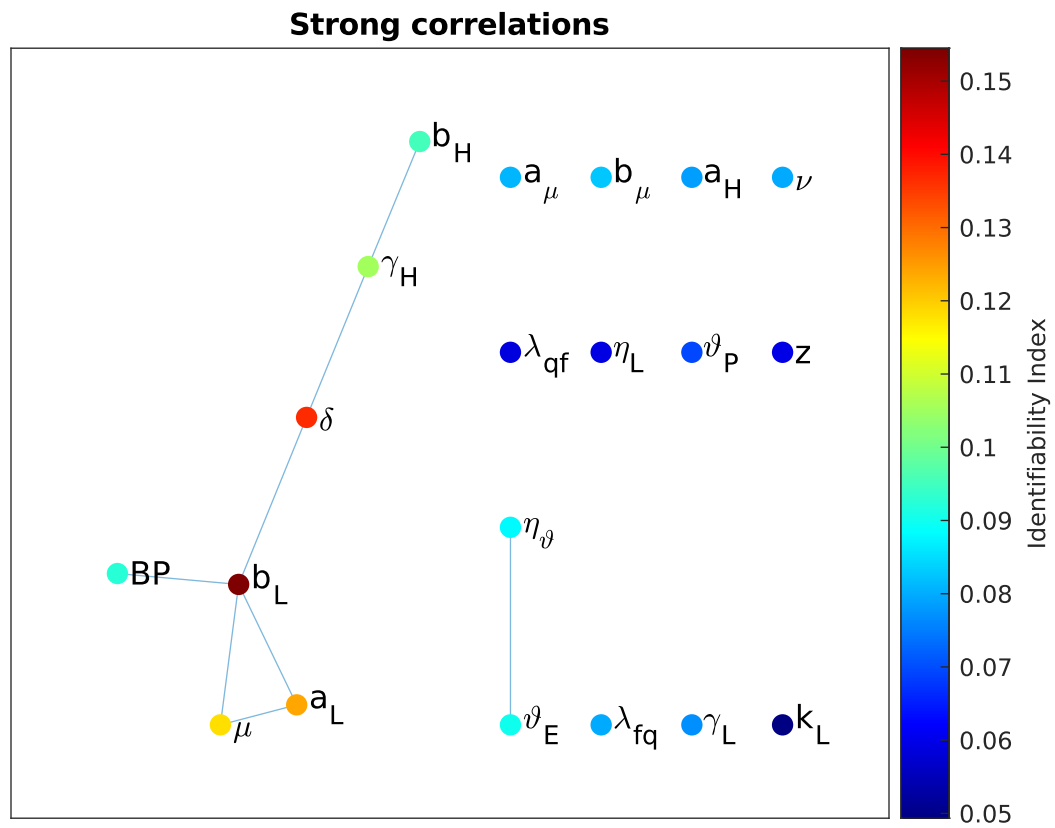
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4832'	'0.5147'	'0.4989'	'0.0006'	'0.08'
\vartheta_E	'0.2646'	'0.2971'	'0.2809'	'0.0004'	'0.0902'
\gamma_L	'0.3492'	'0.3918'	'0.3705'	'0.3472'	'0.077'
k_L	'5.4031'	'5.614'	'5.5085'	'7.3881'	'0.0493'
\lambda_{qf}	'0.4876'	'0.5116'	'0.4996'	'0.2824'	'0.059'
\delta	'0.0678'	'0.0772'	'0.0725'	'0.0603'	'0.1368'
\eta_L	'0.4882'	'0.5109'	'0.4996'	'0.2139'	'0.0593'
\vartheta_P	'0.009'	'0.0155'	'0.0122'	'0.0001'	'0.0697'
\gamma_H	'0.6073'	'0.6463'	'0.6268'	'0.5202'	'0.1055'
z	'14.2889'	'15.3181'	'14.8035'	'29.4698'	'0.0597'
\eta_{\vartheta}	'0.8286'	'0.8675'	'0.8481'	'0.6864'	'0.088'
a_L	'6.4353'	'7.1383'	'6.7868'	'14.7357'	'0.1238'
b_L	'6.6188'	'7.4167'	'7.0178'	'7.7558'	'0.1545'
a_{\mu}	'5.0109'	'5.5253'	'5.2681'	'12.1505'	'0.0813'
b_{\mu}	'8.8651'	'9.4375'	'9.1513'	'3.3776'	'0.0829'
\mu	'0.5026'	'0.5419'	'0.5223'	'0.7404'	'0.1181'
a_H	'7.6836'	'8.2732'	'7.9784'	'1.0318'	'0.0789'
b_H	'8.3532'	'8.8945'	'8.6239'	'6.4617'	'0.0956'
\nu	'232.5578'	'256.991'	'244.7744'	'3.5998'	'0.08'
BP	'431.0466'	'431.9534'	'431.5'	'415.4996'	'0.0928'

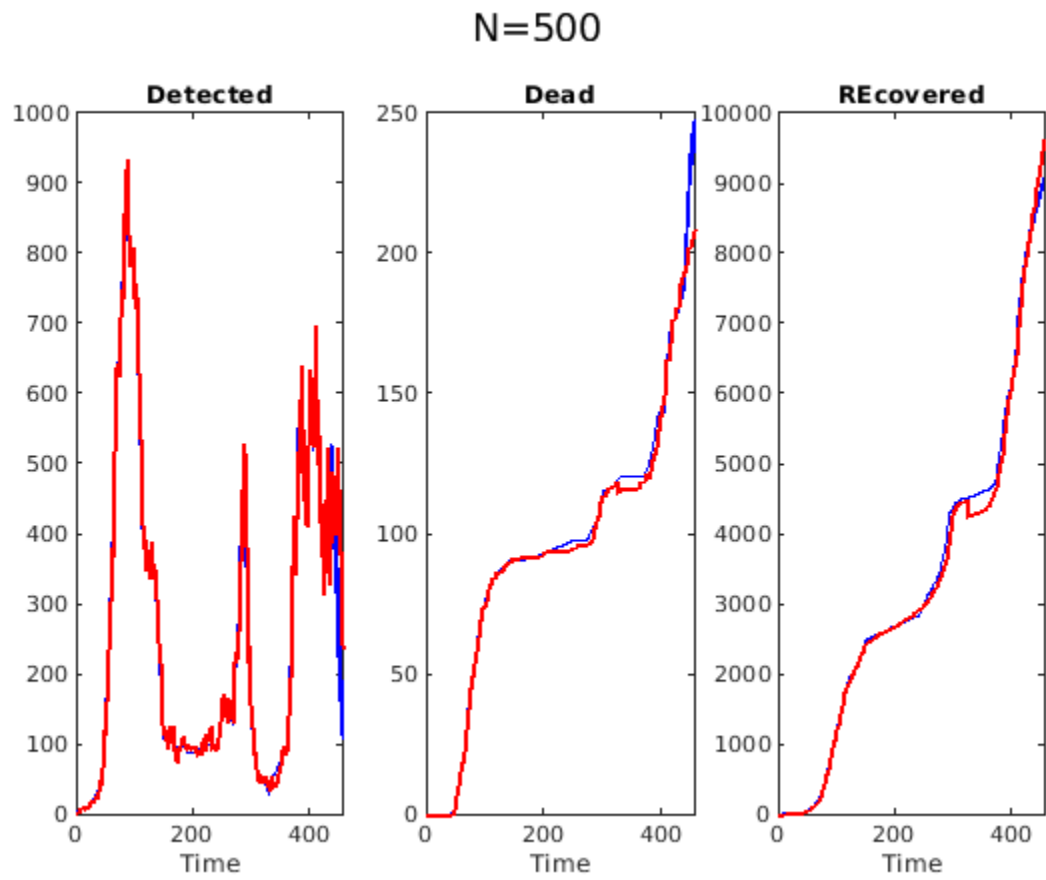
### 15.3. Identifiability analysis







## 15.4. Uncertainty analysys



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## Chapter 16. Extension number16

### 16.1. Basic information

The extension to be validated consists of the time series from the data457 to the 692. The status of the validation is: COMPLETED.

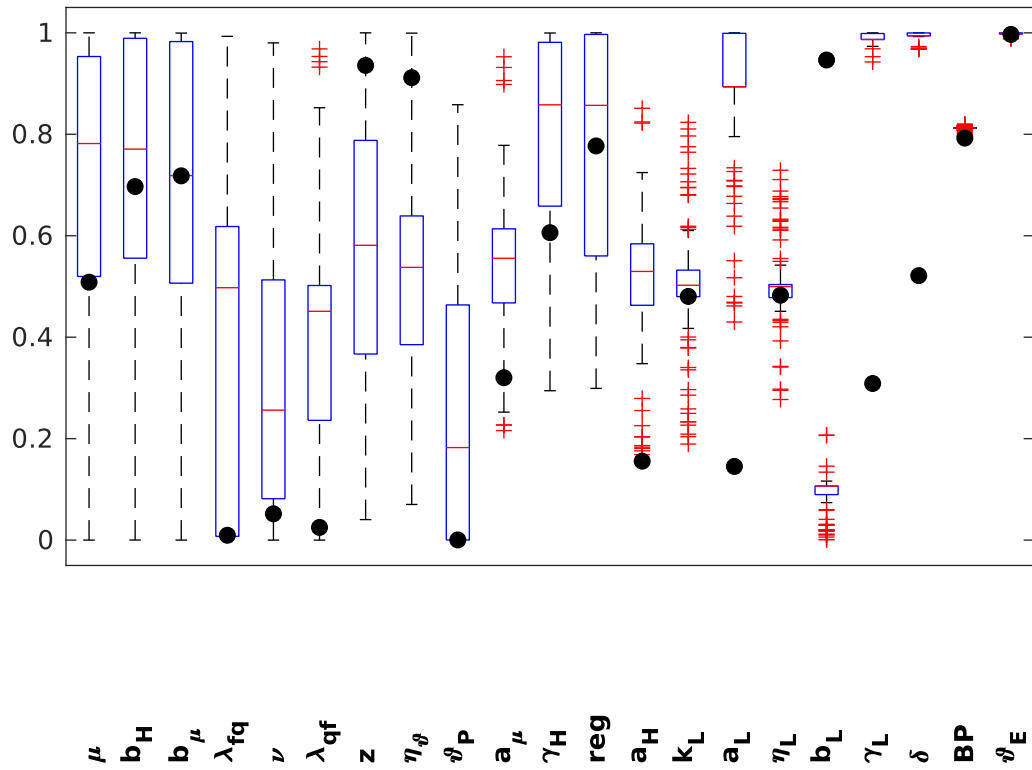
The number of estimations needed to perform the validation was1000.

### 16.2. Estimated parameters with their intervals

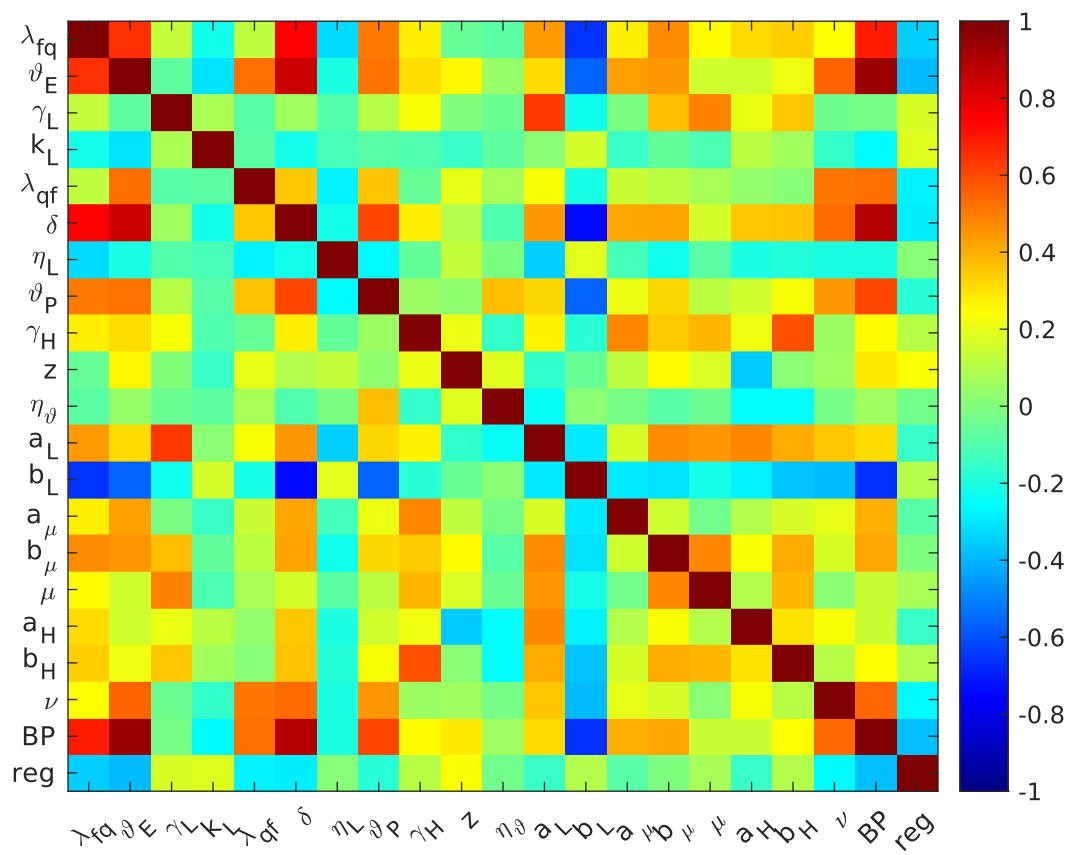
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

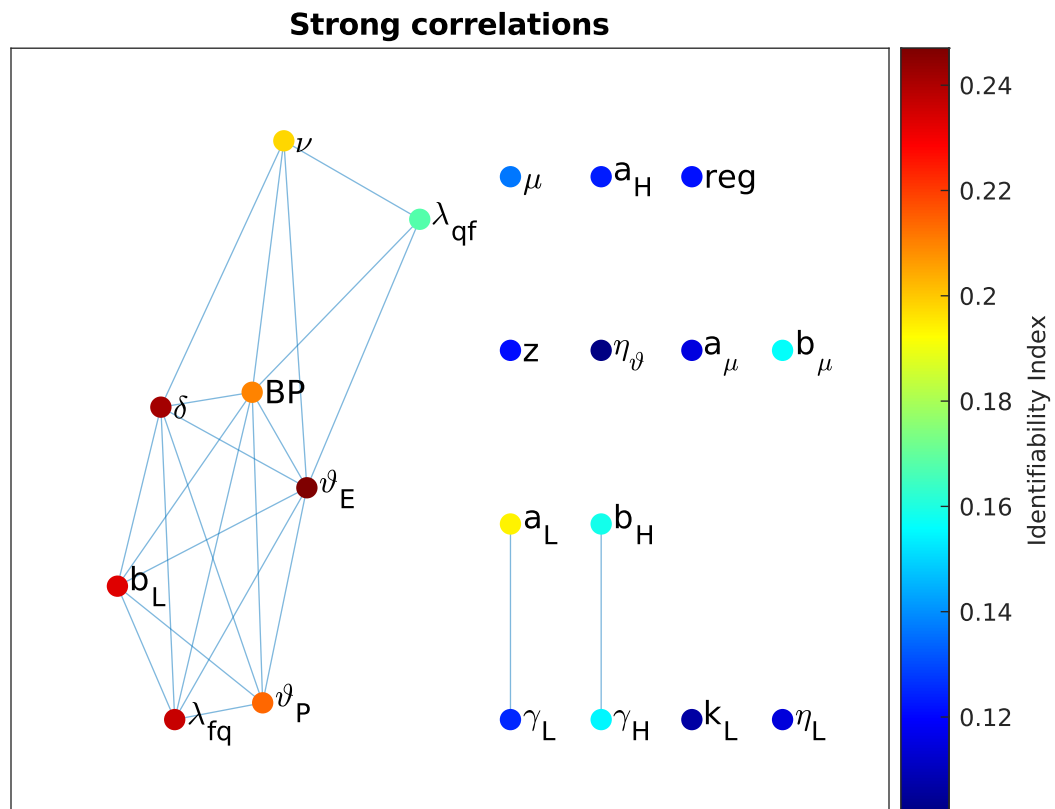
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4294'	'0.5657'	'0.4975'	'0.0095'	'0.2364'
\vartheta_E	'0.9081'	'1'	'0.9977'	'0.9969'	'0.247'
\gamma_L	'0.9017'	'1'	'0.9869'	'0.3087'	'0.1255'
k_L	'5.061'	'5.9827'	'5.5218'	'5.3234'	'0.1068'
\lambda_{qf}	'0.3934'	'0.5087'	'0.4511'	'0.025'	'0.1682'
\delta	'0.1351'	'0.15'	'0.1491'	'0.0782'	'0.2417'
\eta_L	'0.4494'	'0.55'	'0.4997'	'0.4827'	'0.1149'
\vartheta_P	'0.1239'	'0.241'	'0.1824'	'0.0003'	'0.2138'
\gamma_H	'0.7934'	'0.9228'	'0.8581'	'0.606'	'0.1549'
z	'15.5875'	'19.2798'	'17.4337'	'28.0725'	'0.1213'
\eta_{\vartheta}	'0.4845'	'0.5909'	'0.5377'	'0.9116'	'0.1019'
a_L	'12.376'	'14.6452'	'13.5106'	'3.0333'	'0.1943'
b_L	'1.4616'	'3.5227'	'2.4922'	'14.2502'	'0.2334'
a_{\mu}	'8.1555'	'9.402'	'8.7787'	'5.4813'	'0.1155'
b_{\mu}	'10.1624'	'11.9578'	'11.0601'	'11.0529'	'0.1567'
\mu	'0.7157'	'0.8479'	'0.7818'	'0.5085'	'0.1366'
a_H	'7.7427'	'9.0864'	'8.4145'	'3.1782'	'0.1238'
b_H	'10.9231'	'12.6571'	'11.7901'	'10.7566'	'0.1587'
\nu	'95.0187'	'161.1681'	'128.0934'	'25.9339'	'0.198'
BP	'632.4896'	'636.5104'	'634.5'	'629.5'	'0.2102'
reg	'0.2'	'0.2285'	'0.2143'	'0.1942'	'0.1222'

### 16.3. Identifiability analysis









## 16.4. Uncertainty analysys

