

# **Validation process forTOLIMA**

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

The number of estimations needed to perform the validation was1000.

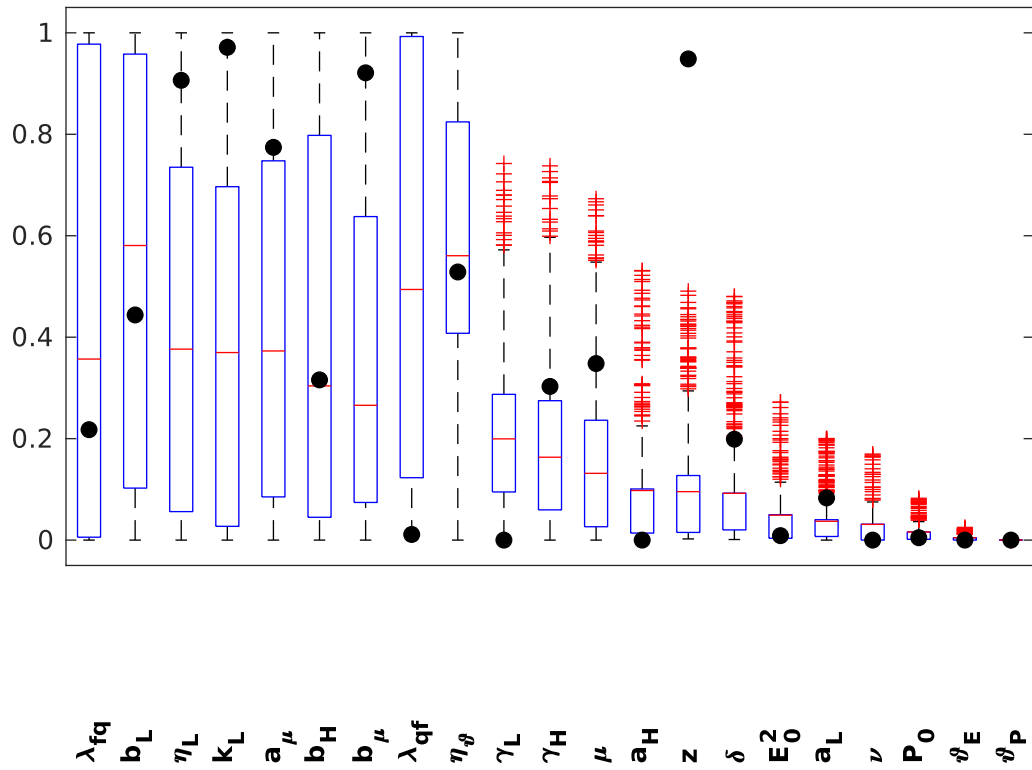
### 1.2. Estimated parameters with their intervals

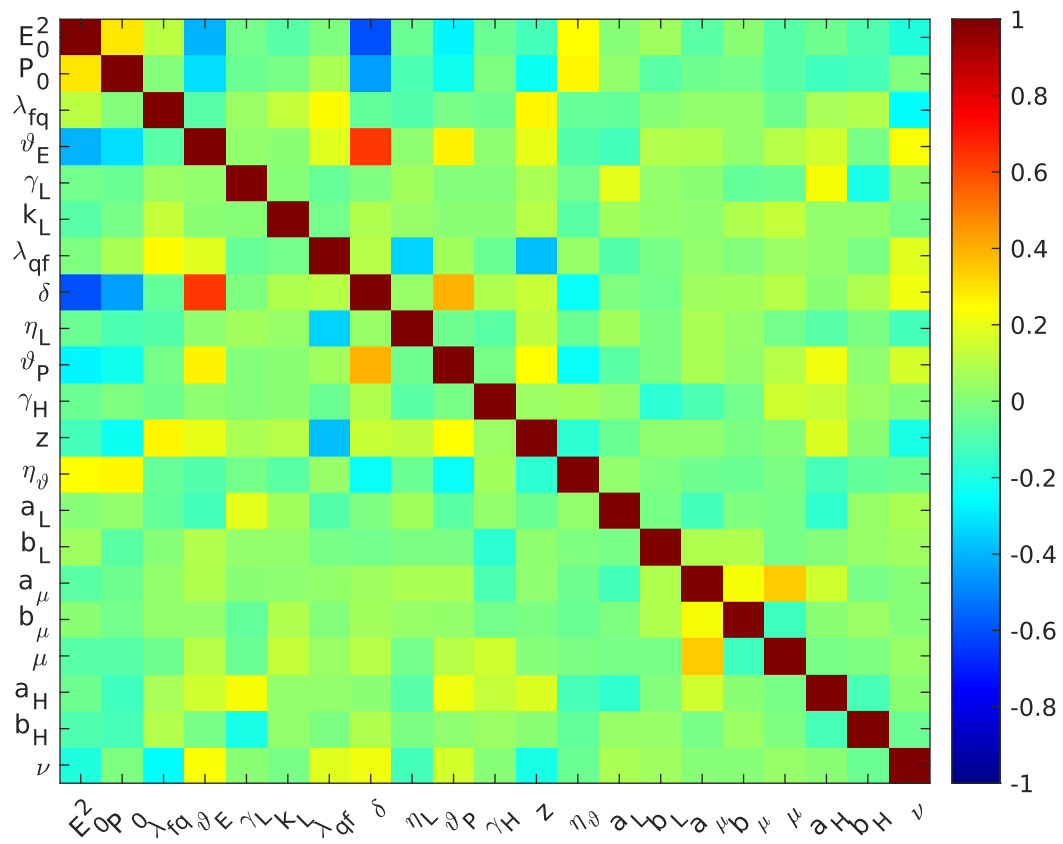
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

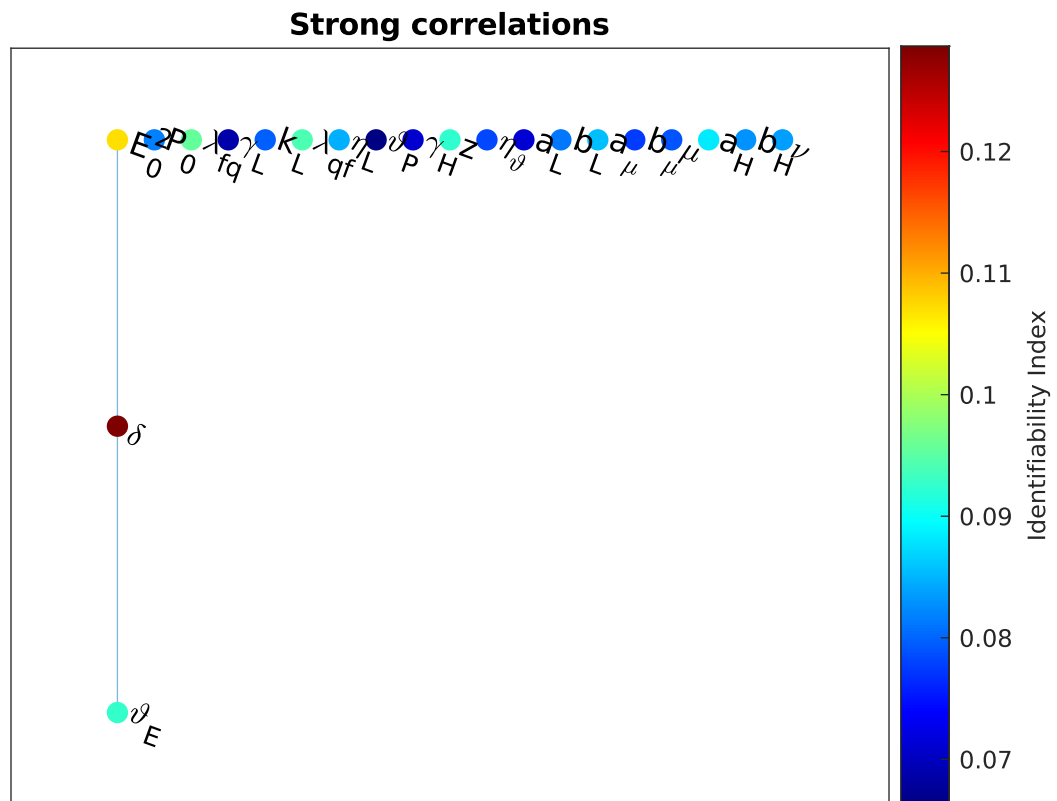
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
E^2_0	'16.2547'	'22.9674'	'100.208'	'17.5487'	'0.1071'
P_0	'1.7638'	'2.6431'	'6.4226'	'1.8848'	'0.0818'
\lambda_{fq}	'0.2167'	'0.2202'	'0.3569'	'0.2177'	'0.0956'
\vartheta_E	'0'	'0'	'0.0046'	'0'	'0.0926'
\gamma_L	'0'	'0'	'0.2'	'0'	'0.0689'
k_L	'3.2476'	'10'	'4.3276'	'9.7427'	'0.0797'
\lambda_{qf}	'0.0105'	'0.0112'	'0.4941'	'0.0111'	'0.0943'
\delta	'0.026'	'0.0335'	'0.0139'	'0.0298'	'0.1287'
\eta_L	'0.8864'	'0.9145'	'0.3765'	'0.9064'	'0.0846'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0663'
\gamma_H	'0.275'	'0.3106'	'0.1638'	'0.3029'	'0.0711'
z	'26.9142'	'28.4942'	'2.8655'	'28.4568'	'0.0926'
\eta_{\vartheta}	'0.5115'	'0.5353'	'0.5606'	'0.5286'	'0.0784'
a_L	'1.2485'	'10.9387'	'1.5206'	'2.1641'	'0.0712'
b_L	'1.35'	'14.3175'	'9.1301'	'7.2139'	'0.0813'
a_{\mu}	'10.5675'	'14.0512'	'6.2201'	'11.8393'	'0.0857'
b_{\mu}	'9.6164'	'14.3754'	'4.7202'	'13.8959'	'0.0776'
\mu	'0.3105'	'0.8529'	'0.1322'	'0.348'	'0.079'
a_H	'1'	'1.0521'	'2.3712'	'1.0001'	'0.0884'
b_H	'5.3975'	'6.2723'	'5.2555'	'5.4219'	'0.0831'
\nu	'0'	'0.0001'	'15.6779'	'0'	'0.0837'

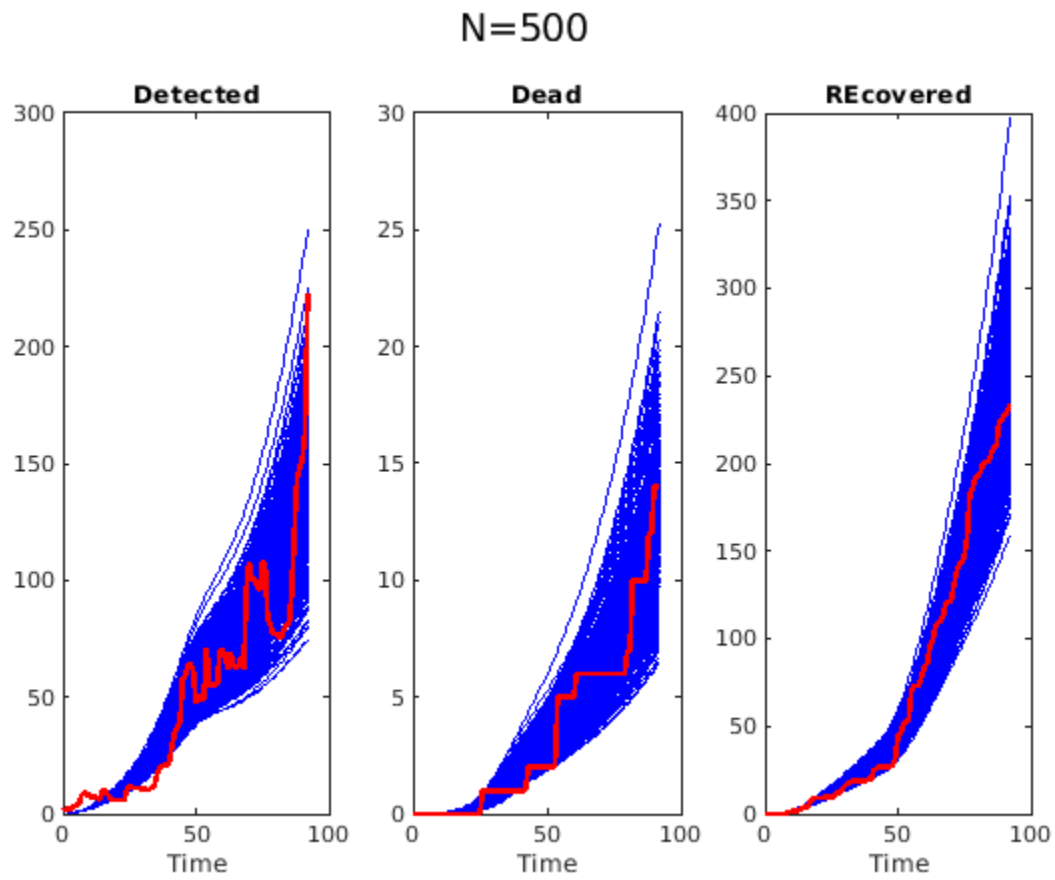
### 1.3. Identifiability analysis







## 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 data93 to the 145. The status of the validation is: COMPLETED.

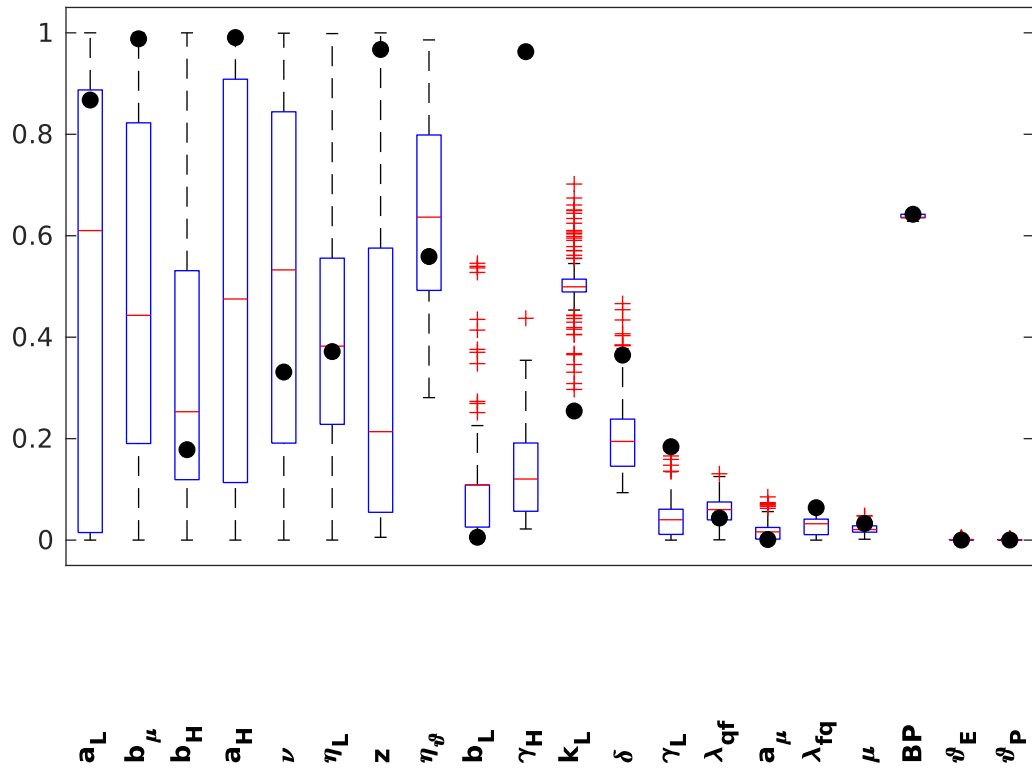
The number of estimations needed to perform the validation was1000.

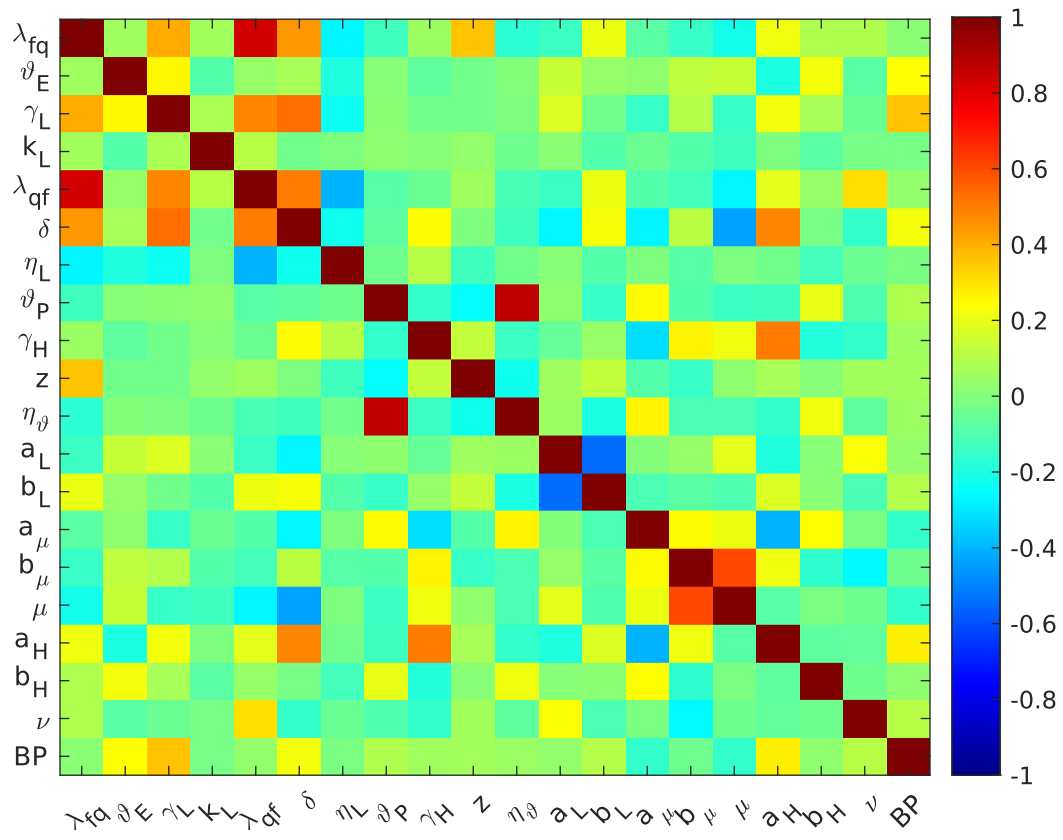
### 2.2. Estimated parameters with their intervals

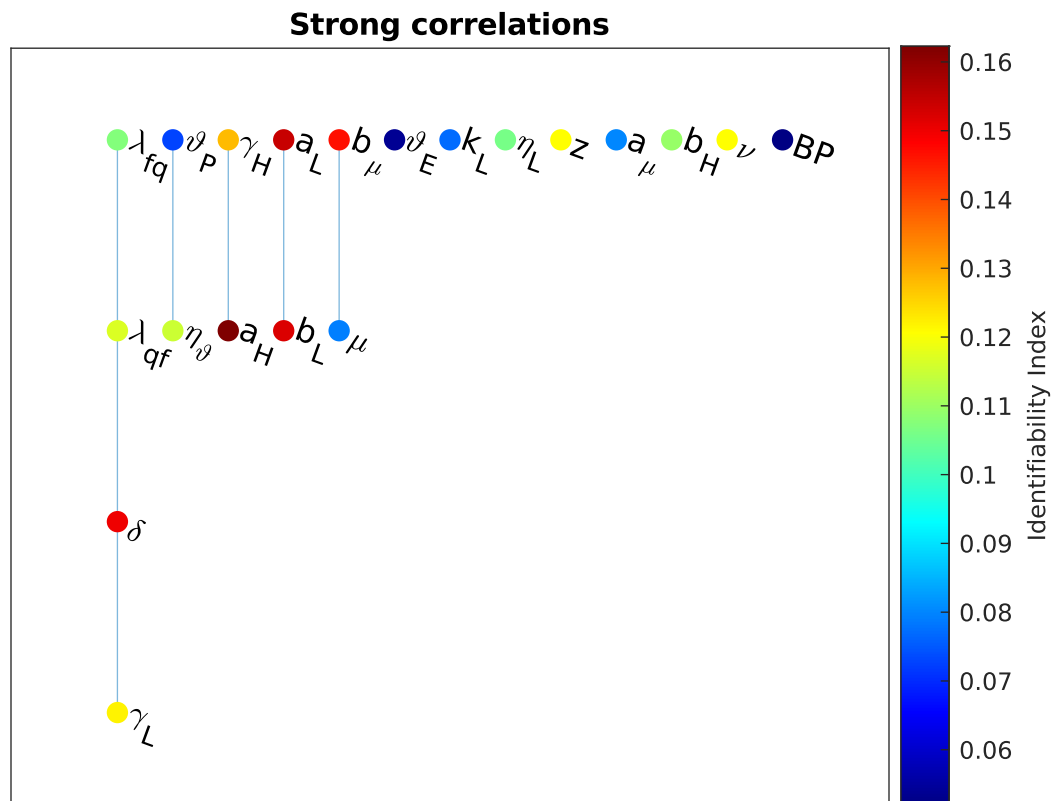
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.012'	'0.0525'	'0.0322'	'0.0639'	'0.1076'
$\vartheta_E$	'0'	'0.0069'	'0.001'	'0.0001'	'0.0539'
$\gamma_L$	'0'	'0.0846'	'0.0401'	'0.1841'	'0.1219'
$k_L$	'5.1362'	'5.8514'	'5.4938'	'3.2903'	'0.0771'
$\lambda_{qf}$	'0.044'	'0.0763'	'0.0601'	'0.0436'	'0.117'
$\delta$	'0.0225'	'0.0358'	'0.0292'	'0.0547'	'0.1499'
$\eta_L$	'0.3263'	'0.4384'	'0.3824'	'0.3716'	'0.1061'
$\vartheta_P$	'0.0002'	'0.0011'	'0.0006'	'0.0002'	'0.0732'
$\gamma_H$	'0.0647'	'0.1761'	'0.1204'	'0.9628'	'0.1279'
$z$	'4.2615'	'8.564'	'6.4127'	'29.0164'	'0.1206'
$\eta_{\vartheta}$	'0.5954'	'0.6779'	'0.6367'	'0.559'	'0.1153'
$a_L$	'8.3156'	'10.7685'	'9.5421'	'13.145'	'0.1542'
$b_L$	'1.3743'	'3.6694'	'2.5219'	'1.0786'	'0.1523'
$a_{\mu}$	'1'	'1.5088'	'1.2268'	'1.016'	'0.0804'
$b_{\mu}$	'6.2073'	'8.2002'	'7.2038'	'14.8348'	'0.1464'
$\mu$	'0.0186'	'0.023'	'0.0208'	'0.0328'	'0.0796'
$a_H$	'6.549'	'8.7595'	'7.6542'	'14.8692'	'0.1623'
$b_H$	'3.6808'	'5.4047'	'4.5428'	'3.4955'	'0.1094'
$\nu$	'230.7358'	'301.905'	'266.3204'	'165.6479'	'0.1208'
BP	'92.4141'	'92.7996'	'92.6068'	'93.5'	'0.0521'

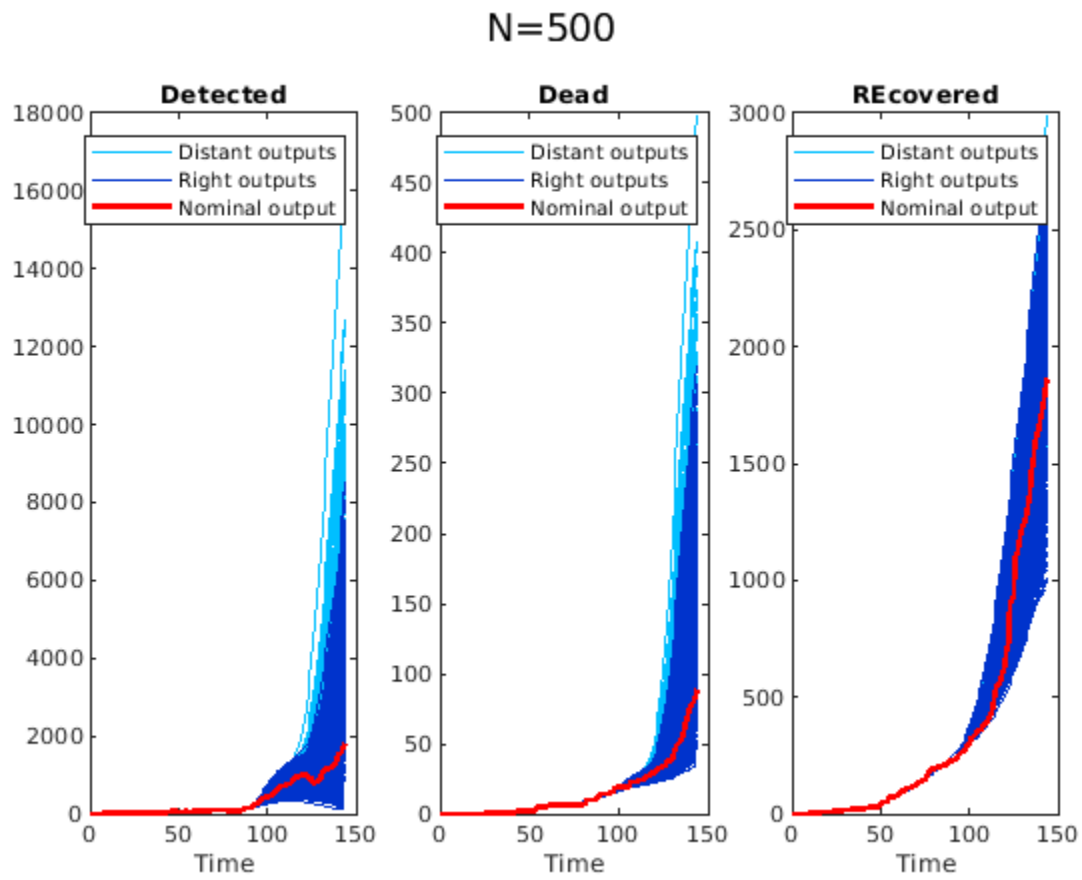
### 2.3. Identifiability analysis







## 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 data145 to the 194. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

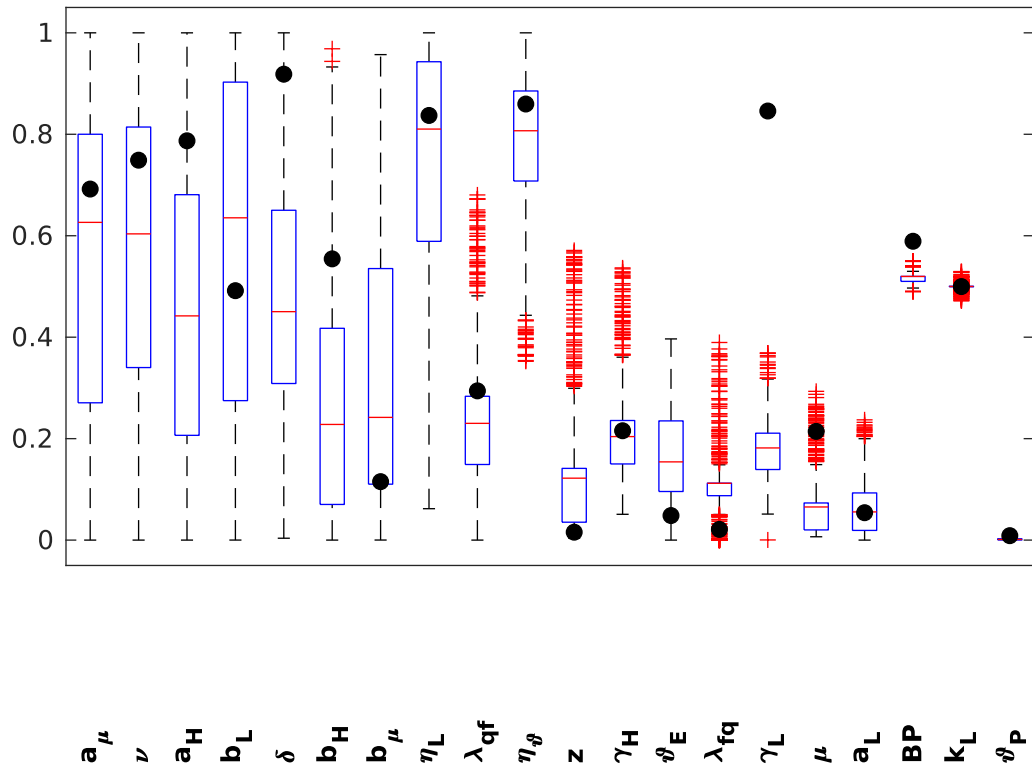
### 3.2. Estimated parameters with their intervals

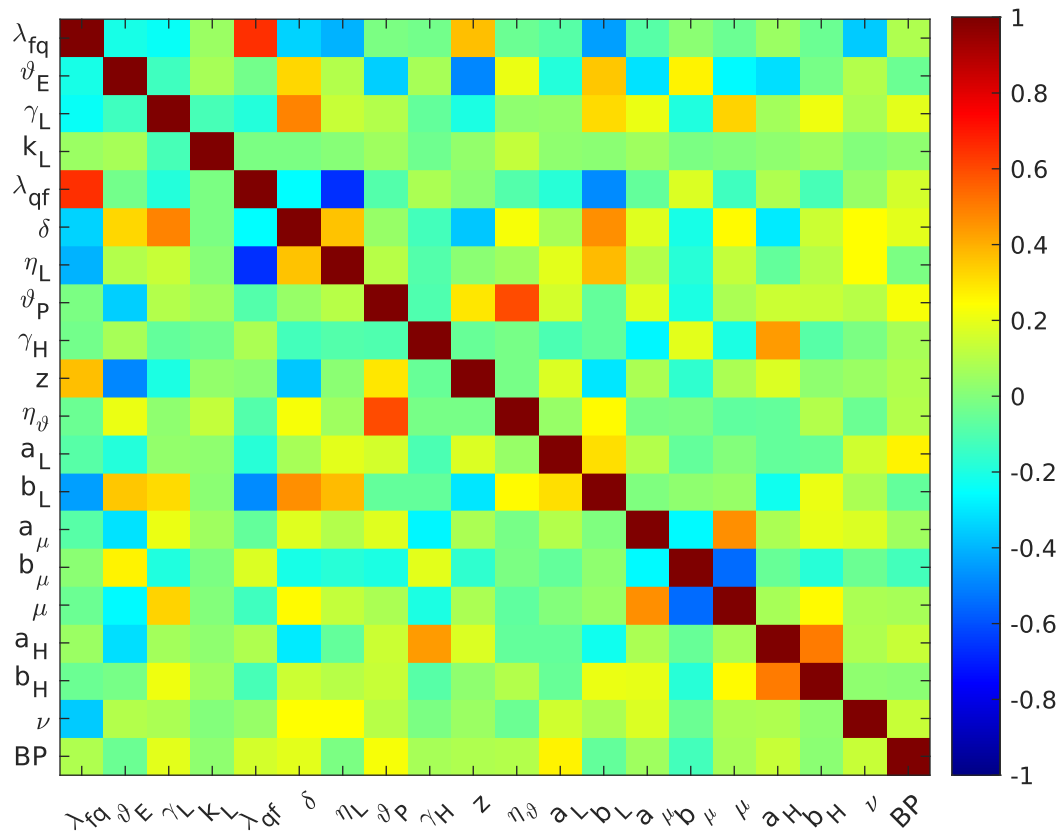
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

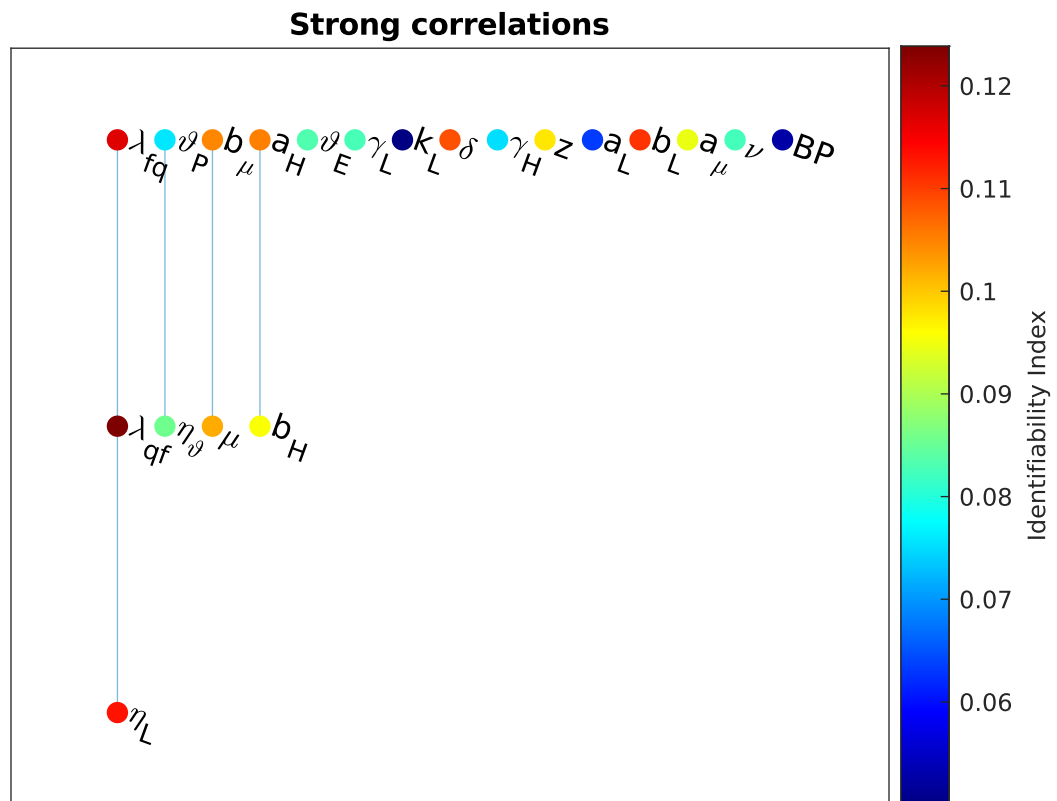
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.018'	'0.0358'	'0.1123'	'0.0211'	'0.1167'
$\vartheta_E$	'0.0119'	'0.1049'	'0.1544'	'0.0484'	'0.0835'
$\gamma_L$	'0.485'	'0.8776'	'0.1819'	'0.8459'	'0.0827'
$k_L$	'1.3476'	'9.559'	'5.5'	'5.498'	'0.05'
$\lambda_{qf}$	'0.2879'	'0.4252'	'0.2304'	'0.2942'	'0.1239'
$\delta$	'0.1016'	'0.1419'	'0.0676'	'0.1378'	'0.1089'
$\eta_L$	'0.6696'	'1'	'0.8102'	'0.8371'	'0.1132'
$\vartheta_P$	'0.0025'	'0.009'	'0.0012'	'0.0087'	'0.0758'
$\gamma_H$	'0.1841'	'0.3067'	'0.2044'	'0.2156'	'0.0753'
$z$	'0.3949'	'0.4763'	'3.6936'	'0.4679'	'0.0976'
$\eta_{\vartheta}$	'0.8226'	'0.991'	'0.8069'	'0.8597'	'0.0857'
$a_L$	'1.7101'	'3.0369'	'1.7794'	'1.7561'	'0.0635'
$b_L$	'7.8815'	'10.3776'	'9.8947'	'7.8837'	'0.1108'
$a_{\mu}$	'8.8967'	'14.7499'	'9.7689'	'10.6883'	'0.0945'
$b_{\mu}$	'1.3575'	'3.1213'	'4.3919'	'2.6132'	'0.1048'
$\mu$	'0.0501'	'0.3534'	'0.0654'	'0.2143'	'0.1021'
$a_H$	'8.7412'	'13.1424'	'7.188'	'12.0203'	'0.1051'
$b_H$	'8.5633'	'12.6281'	'4.2007'	'8.7617'	'0.0958'
$\nu$	'216.0622'	'451.4597'	'301.8356'	'374.4657'	'0.0825'
BP	'152.0614'	'160.133'	'145.5'	'152.5'	'0.0529'

### 3.3. Identifiability analysis

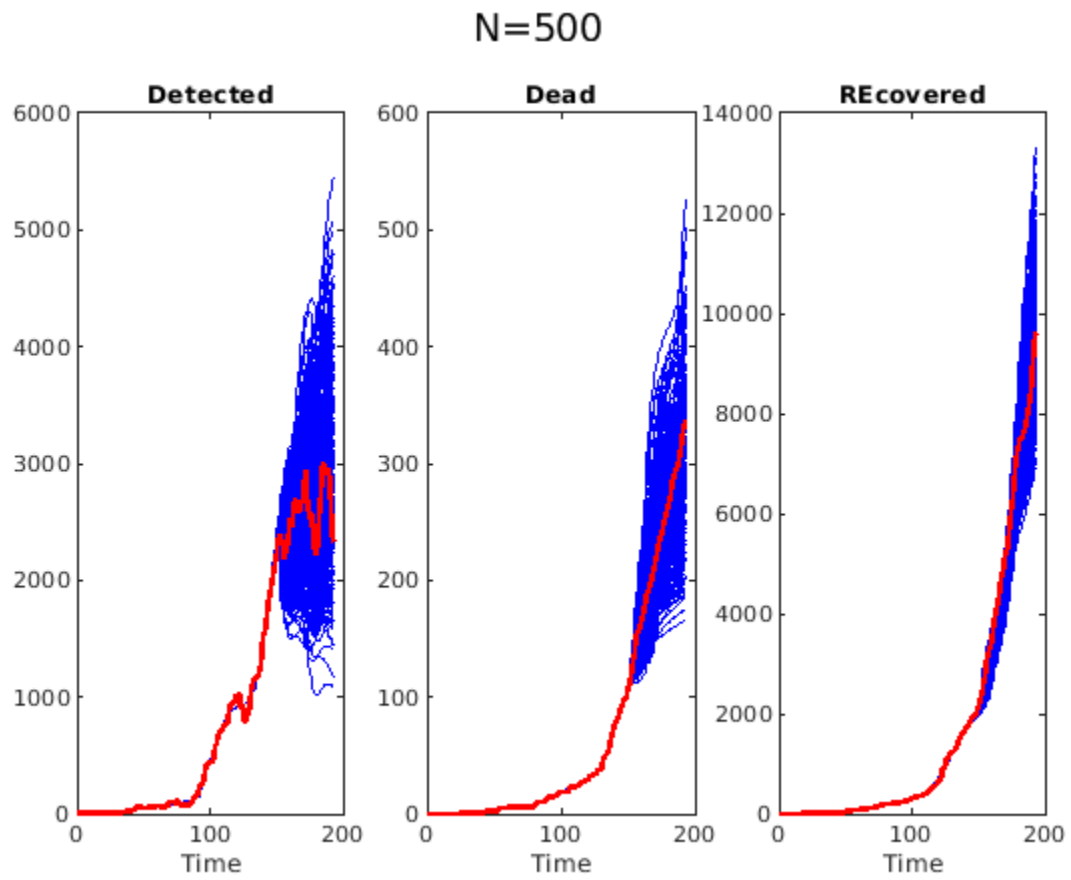








### 3.4. Uncertainty analysys



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## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data194 to the 230. The status of the validation is: COMPLETED.

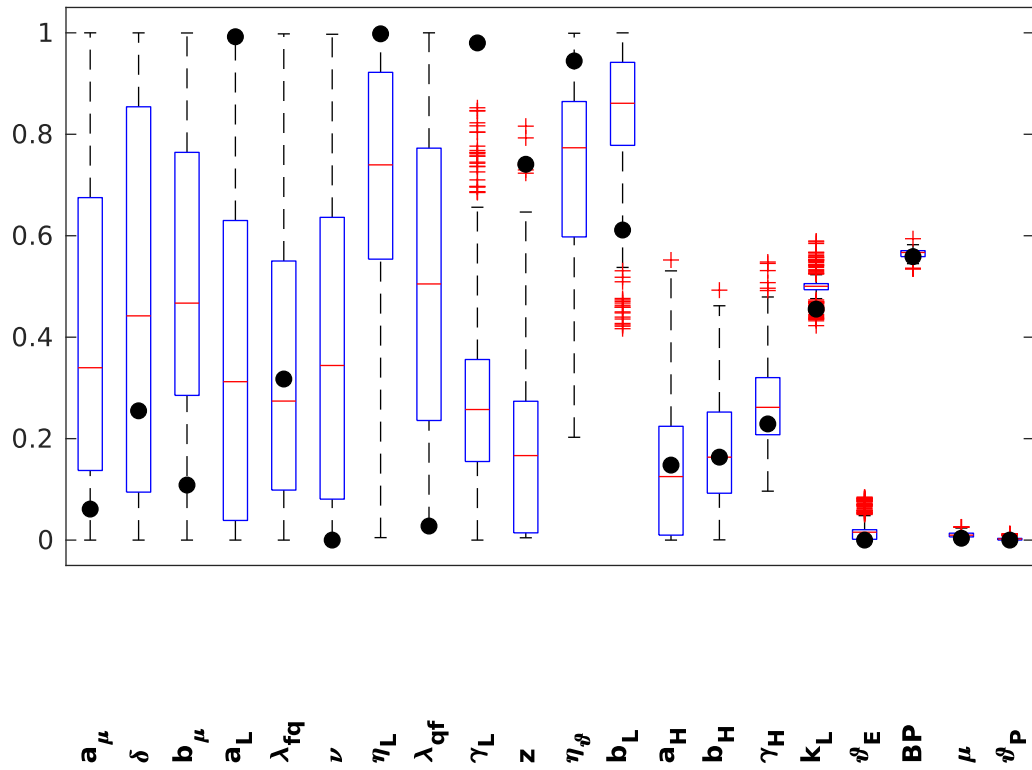
The number of estimations needed to perform the validation was1000.

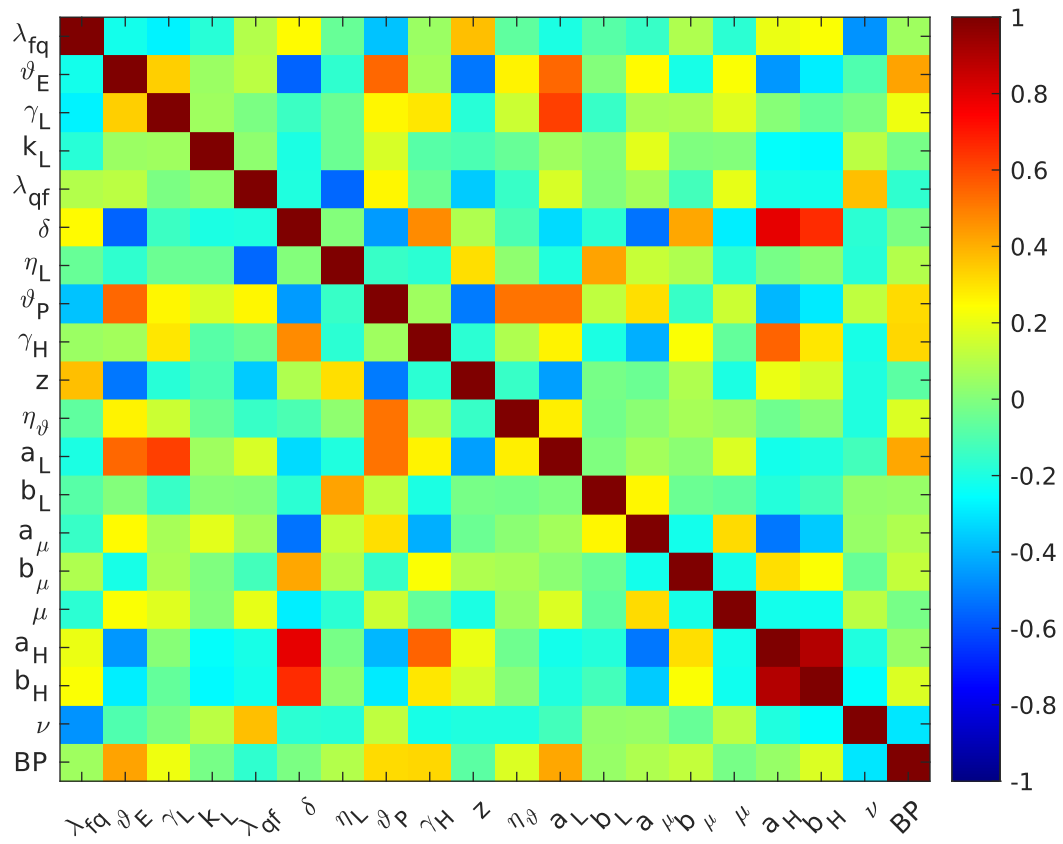
### 4.2. Estimated parameters with their intervals

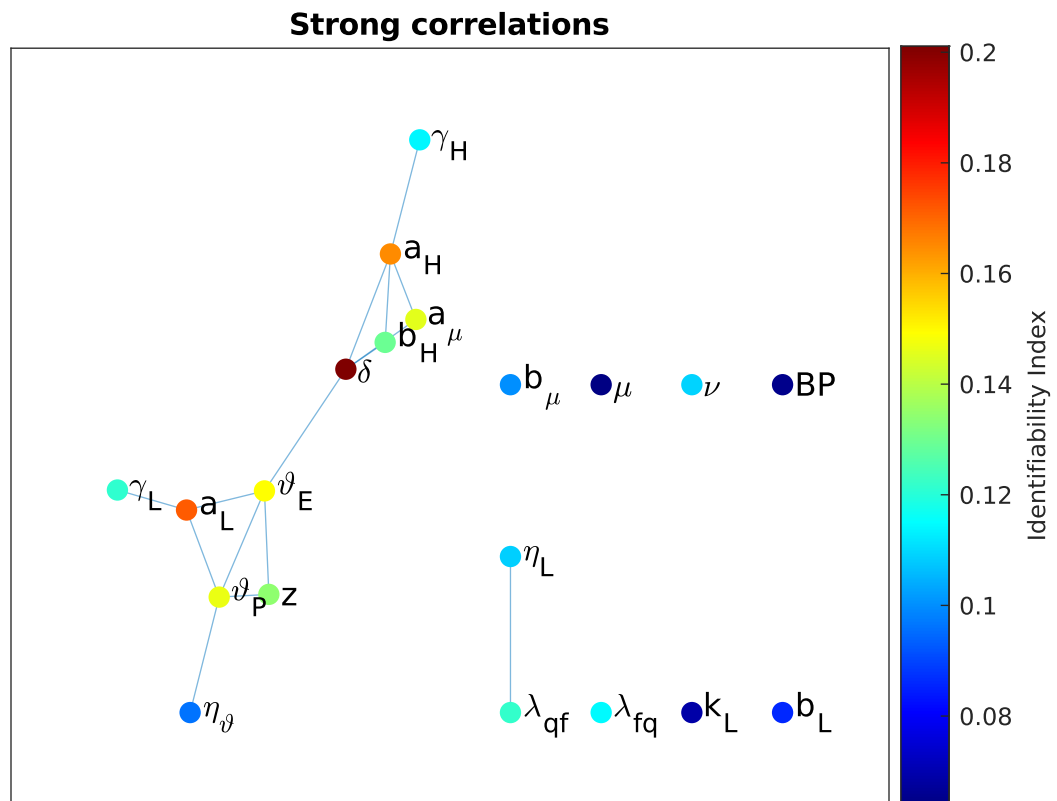
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.2293'	'0.3188'	'0.2741'	'0.3175'	'0.1146'
$\vartheta_E$	'0.0083'	'0.023'	'0.0157'	'0'	'0.1492'
$\gamma_L$	'0.2125'	'0.3025'	'0.2575'	'0.9801'	'0.1218'
$k_L$	'5.3147'	'5.6921'	'5.5034'	'5.0978'	'0.0693'
$\lambda_{qf}$	'0.4615'	'0.5484'	'0.505'	'0.0277'	'0.1224'
$\delta$	'0.0583'	'0.0743'	'0.0663'	'0.0382'	'0.2011'
$\eta_L$	'0.7038'	'0.7757'	'0.7397'	'0.998'	'0.1087'
$\vartheta_P$	'0.0011'	'0.0035'	'0.0023'	'0'	'0.1467'
$\gamma_H$	'0.2358'	'0.2879'	'0.2619'	'0.229'	'0.1141'
$z$	'4.0583'	'5.9945'	'5.0264'	'22.2256'	'0.1345'
$\eta_{\vartheta}$	'0.7447'	'0.8018'	'0.7732'	'0.9446'	'0.0963'
$a_L$	'4.6922'	'6.0516'	'5.3719'	'14.8919'	'0.1715'
$b_L$	'12.5266'	'13.5643'	'13.0454'	'9.5575'	'0.0865'
$a_{\mu}$	'5.122'	'6.3927'	'5.7574'	'1.8562'	'0.1458'
$b_{\mu}$	'6.9721'	'8.1082'	'7.5402'	'2.5195'	'0.1003'
$\mu$	'0.0086'	'0.011'	'0.0098'	'0.0037'	'0.0641'
$a_H$	'2.4859'	'3.0198'	'2.7529'	'3.07'	'0.1652'
$b_H$	'3.0375'	'3.54'	'3.2887'	'3.2891'	'0.1296'
$\nu$	'149.8743'	'194.35'	'172.1121'	'0.0119'	'0.1095'
BP	'193.0354'	'193.333'	'193.1842'	'192.4995'	'0.0652'

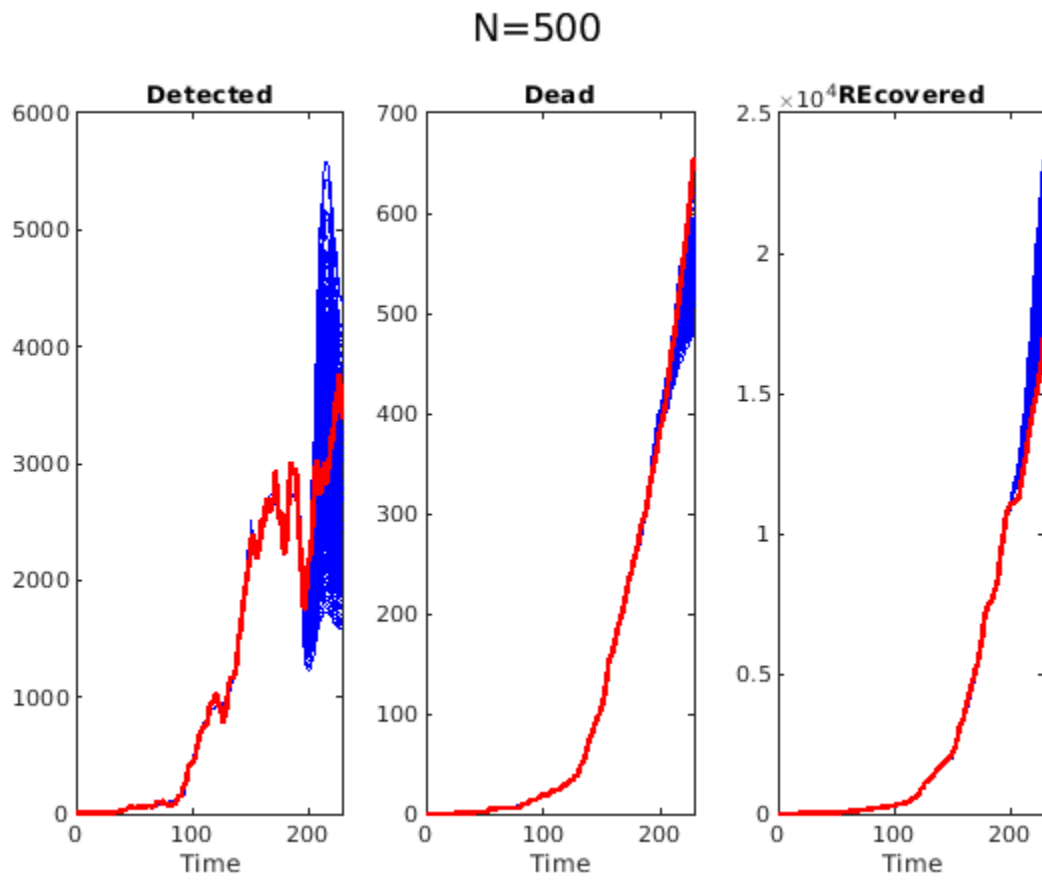
### 4.3. Identifiability analysis







#### 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 data230 to the 273. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

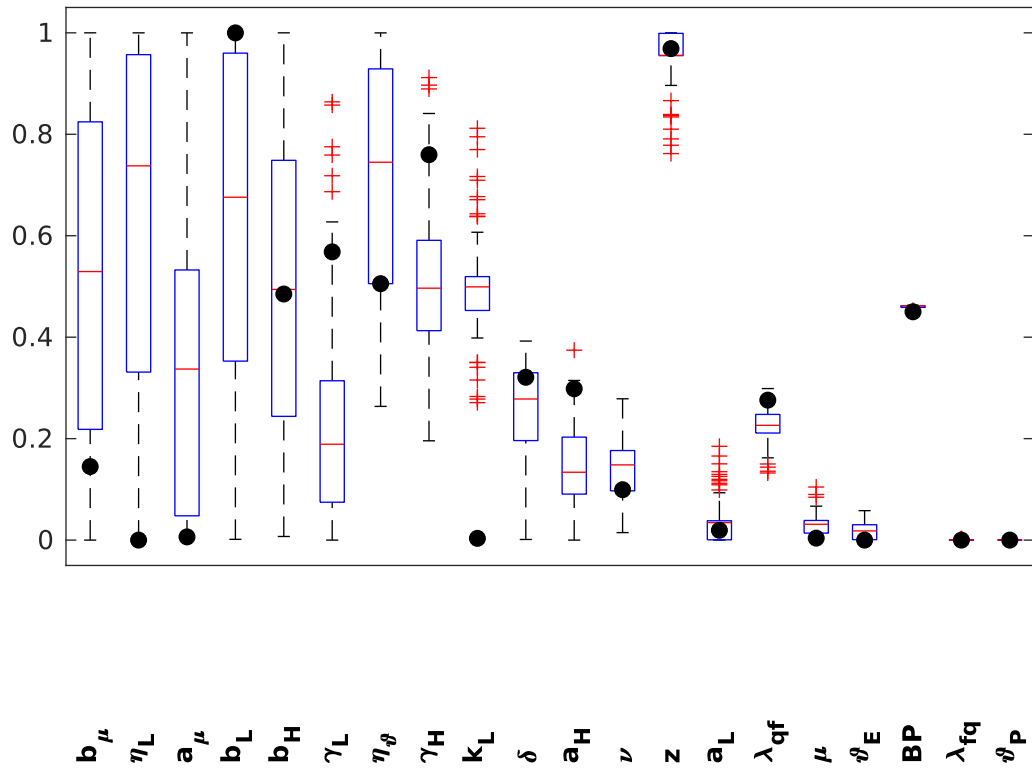
### 5.2. Estimated parameters with their intervals

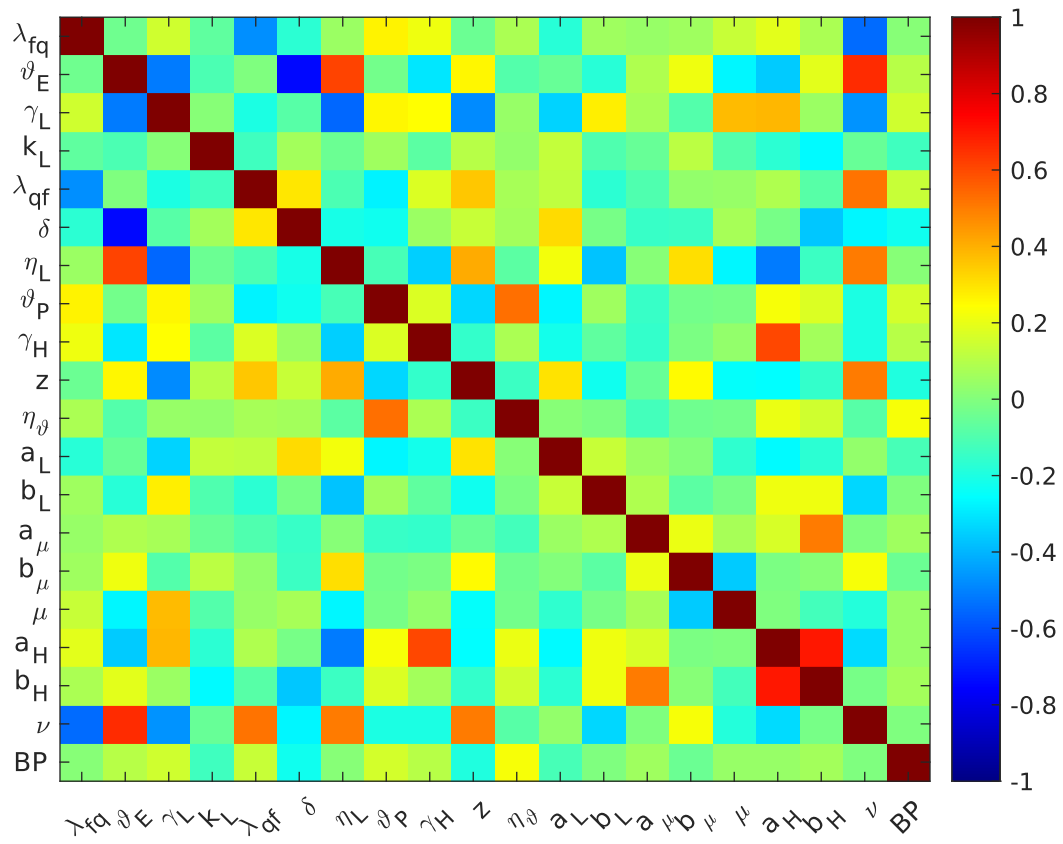
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

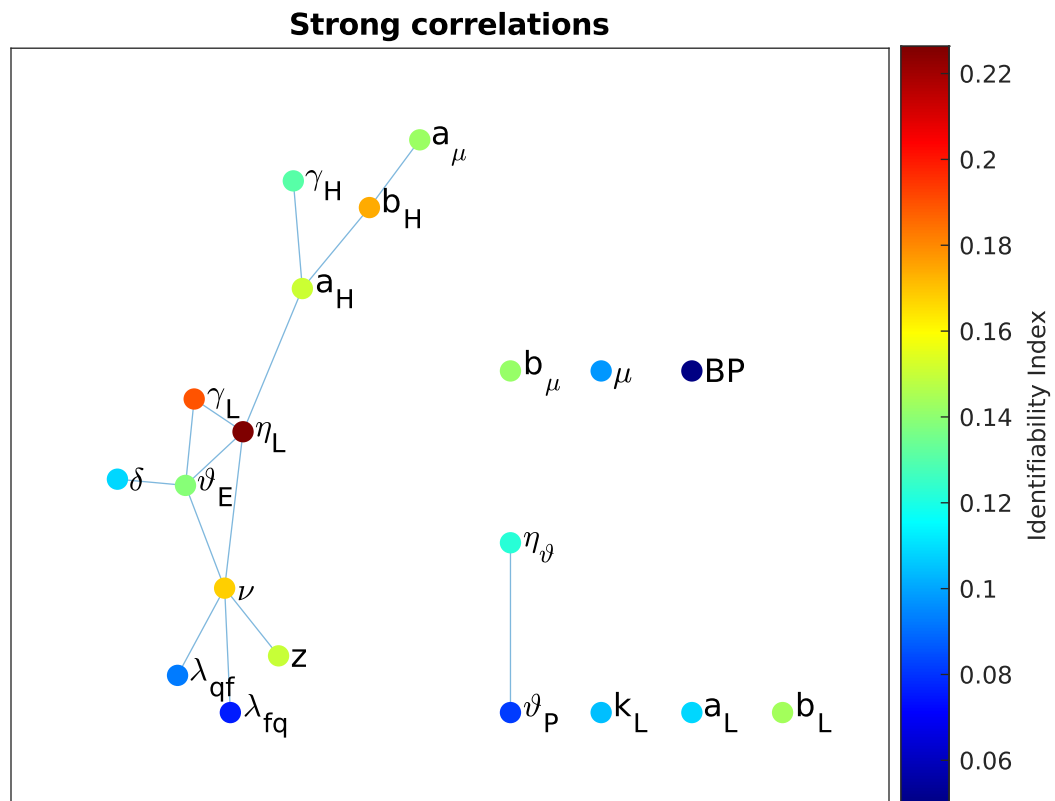
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.006'	'0.0006'	'0'	'0.0762'
$\vartheta_E$	'0.014'	'0.0222'	'0.0181'	'0'	'0.1391'
$\gamma_L$	'0.1117'	'0.2717'	'0.1917'	'0.5682'	'0.1895'
$k_L$	'4.9776'	'6.0082'	'5.4929'	'1.0311'	'0.1046'
$\lambda_{qf}$	'0.2133'	'0.2391'	'0.2262'	'0.2759'	'0.0929'
$\delta$	'0.0377'	'0.0457'	'0.0417'	'0.0481'	'0.109'
$\eta_L$	'0.6471'	'0.8285'	'0.7378'	'0'	'0.2264'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0817'
$\gamma_H$	'0.4446'	'0.5496'	'0.4971'	'0.7598'	'0.1307'
$z$	'26.6928'	'30'	'28.6533'	'29.0674'	'0.15'
$\eta_{\vartheta}$	'0.6857'	'0.8041'	'0.7449'	'0.5055'	'0.1228'
$a_L$	'1'	'2.2665'	'1.4917'	'1.2711'	'0.1087'
$b_L$	'9.2563'	'11.6684'	'10.4624'	'14.9985'	'0.1438'
$a_{\mu}$	'4.6266'	'6.8147'	'5.7207'	'1.0886'	'0.1423'
$b_{\mu}$	'7.1654'	'9.6567'	'8.411'	'3.0294'	'0.1415'
$\mu$	'0'	'0.0815'	'0.0313'	'0.0039'	'0.0977'
$a_H$	'2.4725'	'3.2829'	'2.8777'	'5.1758'	'0.1506'
$b_H$	'6.791'	'9.0461'	'7.9186'	'7.7912'	'0.1745'
$\nu$	'65.8302'	'82.4259'	'74.1281'	'49.6631'	'0.1683'
BP	'230.3575'	'230.6421'	'230.4998'	'229.5554'	'0.0498'



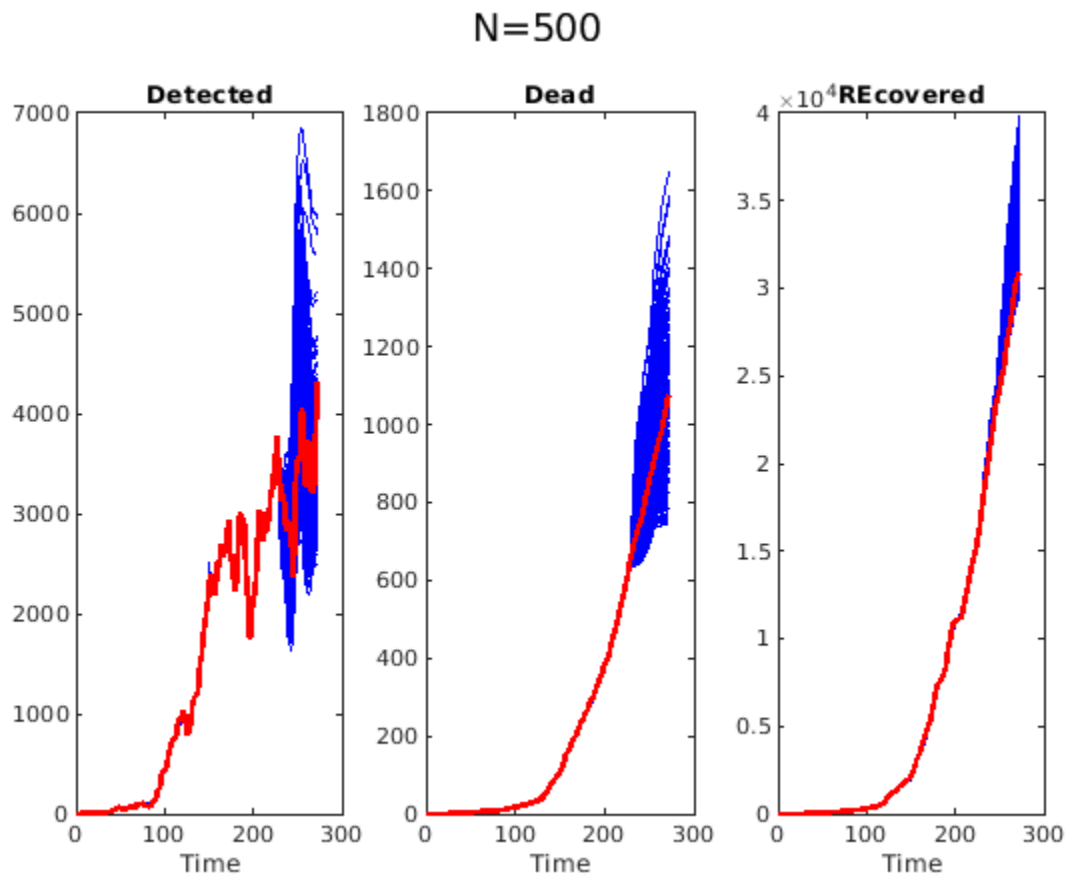
### 5.3. Identifiability analysys







## 5.4. Uncertainty analysis



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## Chapter 6. Extension number6

### 6.1. Basic information

The extension to be validated consists of the time series from the data273 to the 296. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

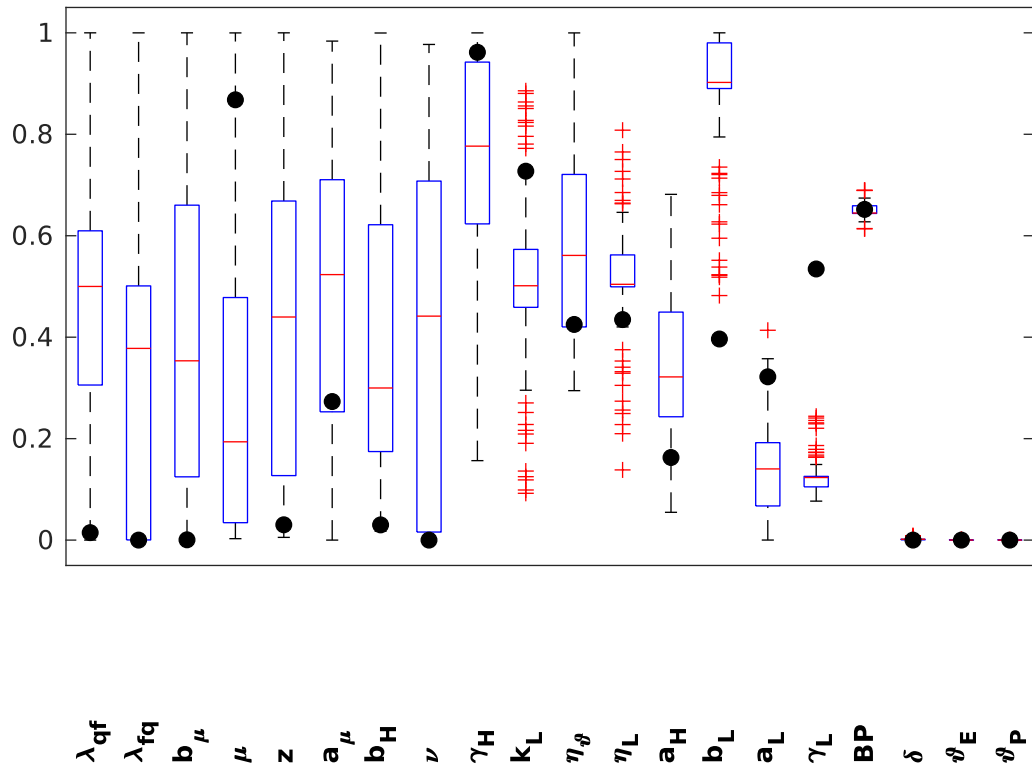
### 6.2. Estimated parameters with their intervals

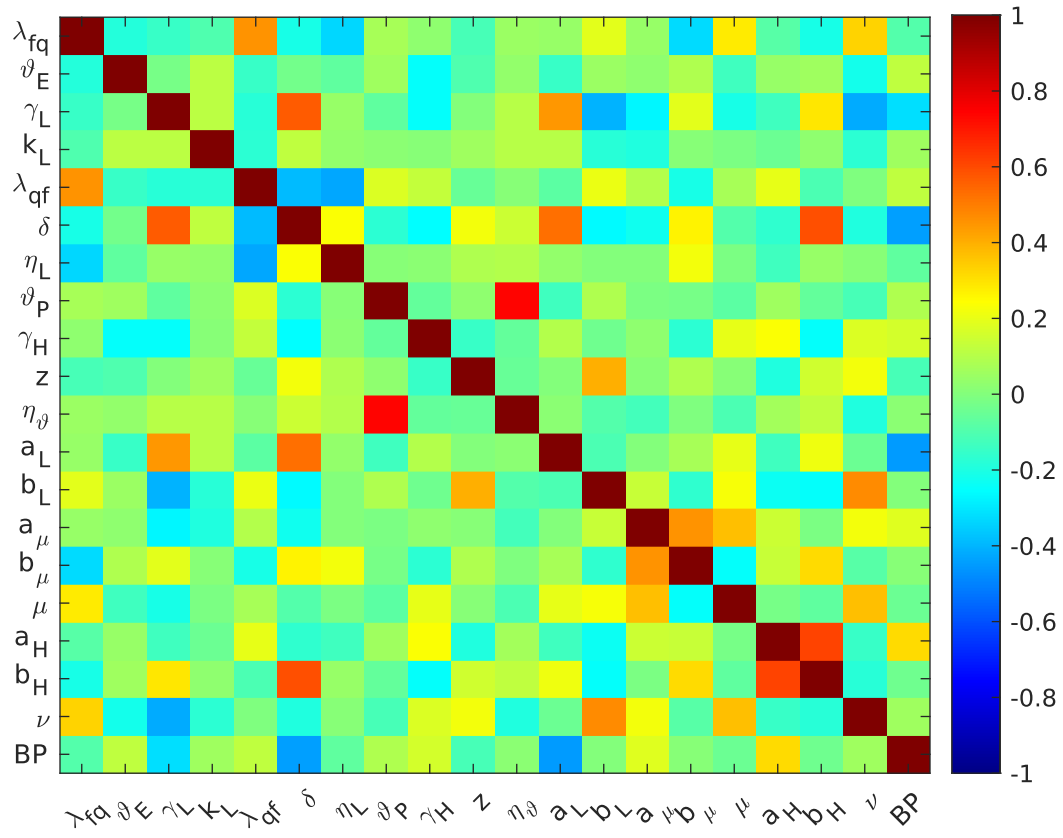
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

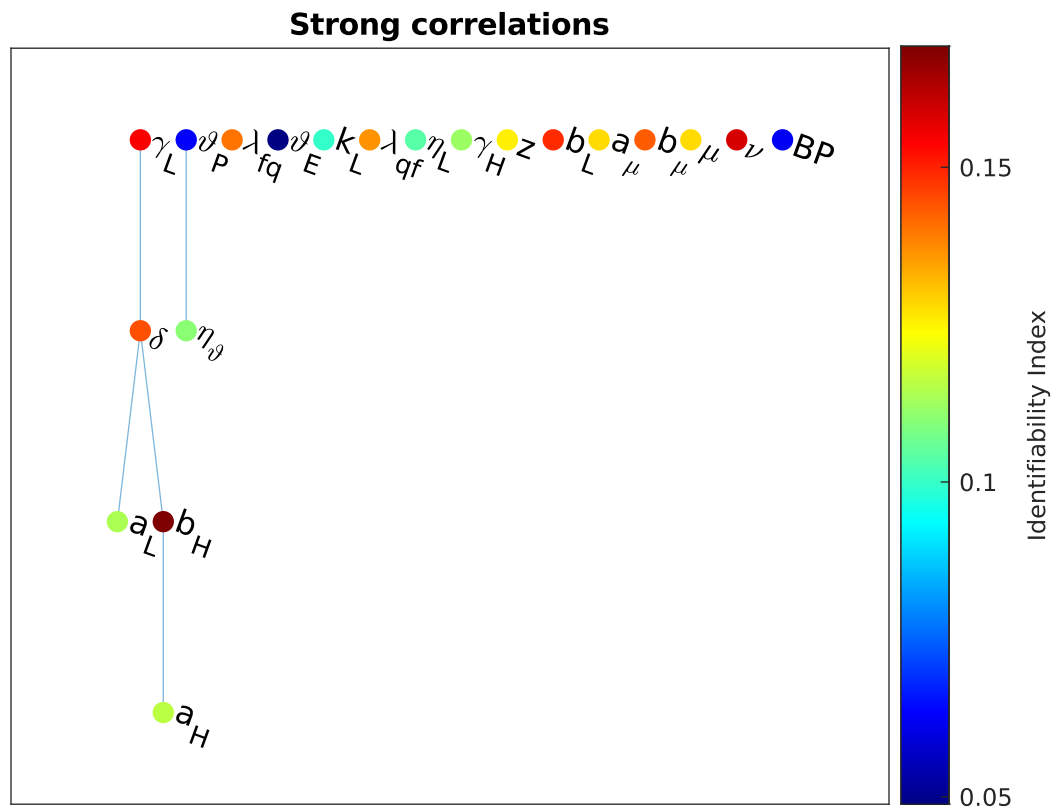
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0.3779'	'0'	'0.1405'
$\vartheta_E$	'0'	'0'	'0.0001'	'0'	'0.0488'
$\gamma_L$	'0.3479'	'0.8422'	'0.1234'	'0.5345'	'0.1544'
$k_L$	'1.7128'	'9.1'	'5.5127'	'7.5451'	'0.0998'
$\lambda_{qf}$	'0.0014'	'0.0318'	'0.5'	'0.0147'	'0.1365'
$\delta$	'0'	'0'	'0.0003'	'0'	'0.1448'
$\eta_L$	'0.2392'	'1'	'0.5042'	'0.4347'	'0.1042'
$\vartheta_P$	'0'	'0'	'0.0001'	'0'	'0.0629'
$\gamma_H$	'0.3845'	'1'	'0.7766'	'0.9616'	'0.1123'
$z$	'0.8845'	'1.5744'	'13.1937'	'0.9056'	'0.1259'
$\eta_{\vartheta}$	'0.4191'	'0.4463'	'0.5612'	'0.4251'	'0.1104'
$a_L$	'4.9166'	'6.3273'	'2.9645'	'5.5064'	'0.1142'
$b_L$	'5.7701'	'8.9531'	'13.6313'	'6.55'	'0.1488'
$a_{\mu}$	'4.6211'	'10.4107'	'8.3274'	'4.824'	'0.128'
$b_{\mu}$	'1'	'1.5119'	'5.9481'	'1.0078'	'0.1433'
$\mu$	'0'	'0.96'	'0.1938'	'0.868'	'0.1283'
$a_H$	'2.949'	'3.899'	'5.5038'	'3.2796'	'0.116'
$b_H$	'1.3208'	'2.5808'	'5.1981'	'1.4198'	'0.1692'
$\nu$	'0'	'0.0012'	'220.7575'	'0.0006'	'0.1587'
BP	'272.8372'	'277.1033'	'272.554'	'273.0267'	'0.0624'

### 6.3. Identifiability analysys

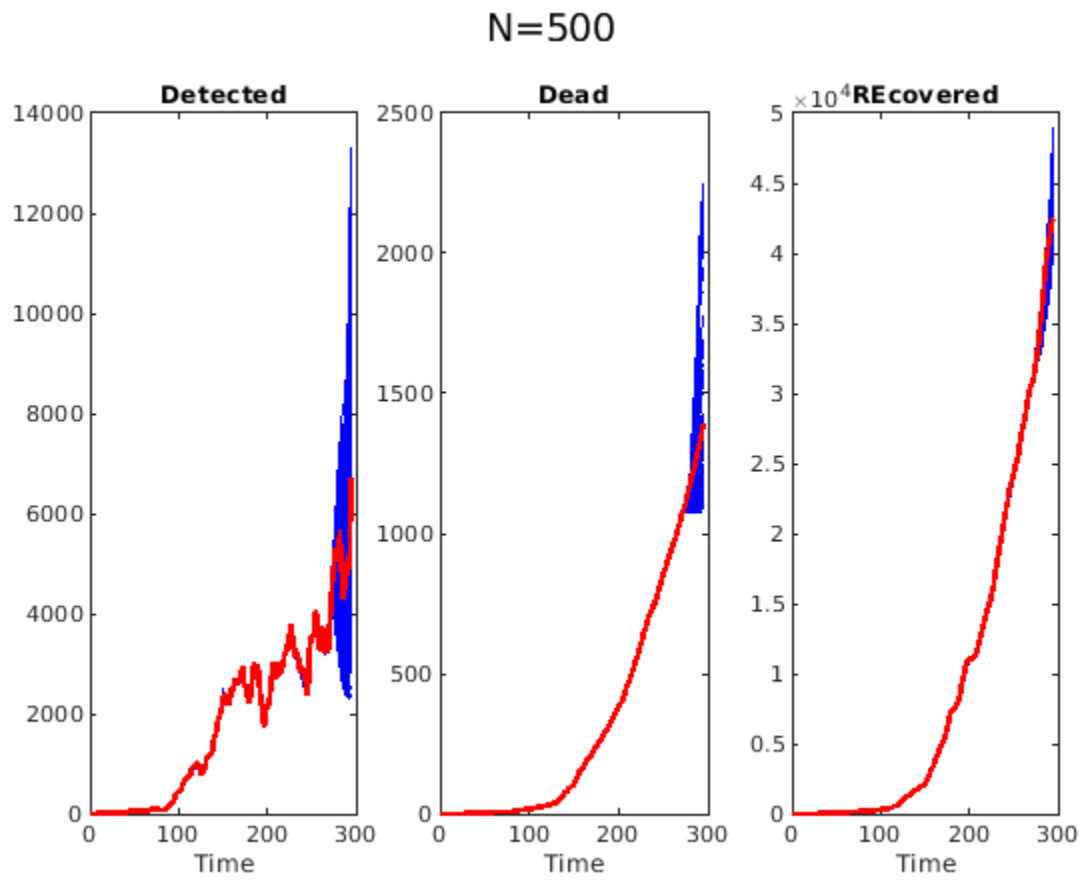








## 6.4. Uncertainty analysys



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## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data296 to the 316. The status of the validation is: COMPLETED.

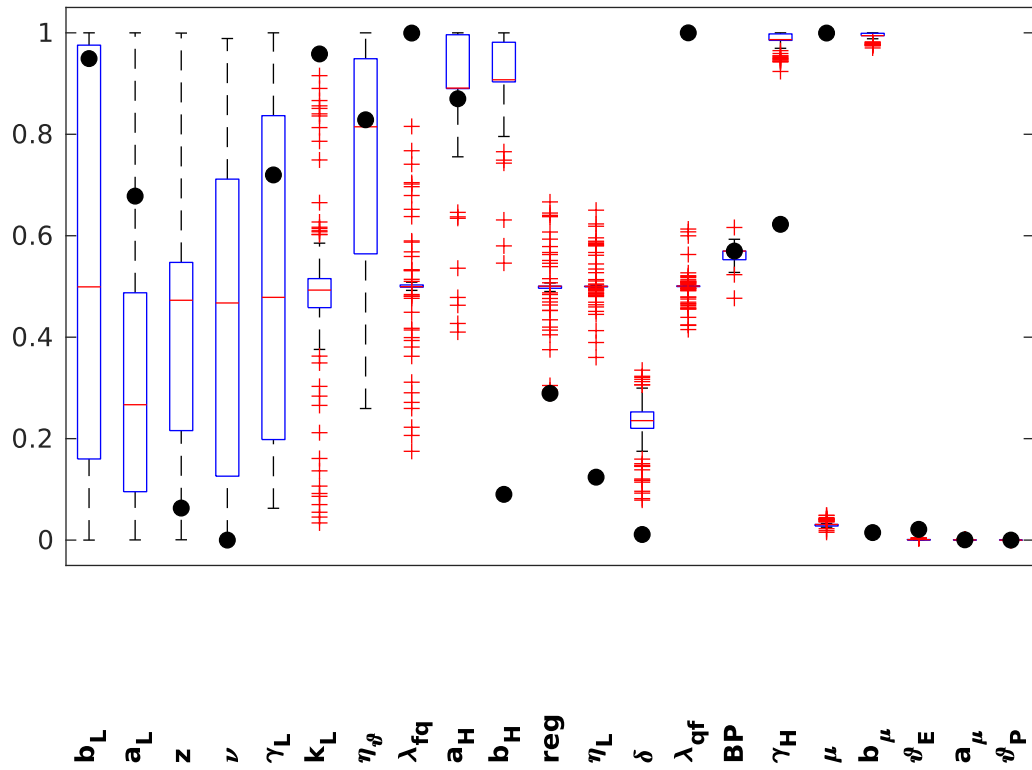
The number of estimations needed to perform the validation was2000.

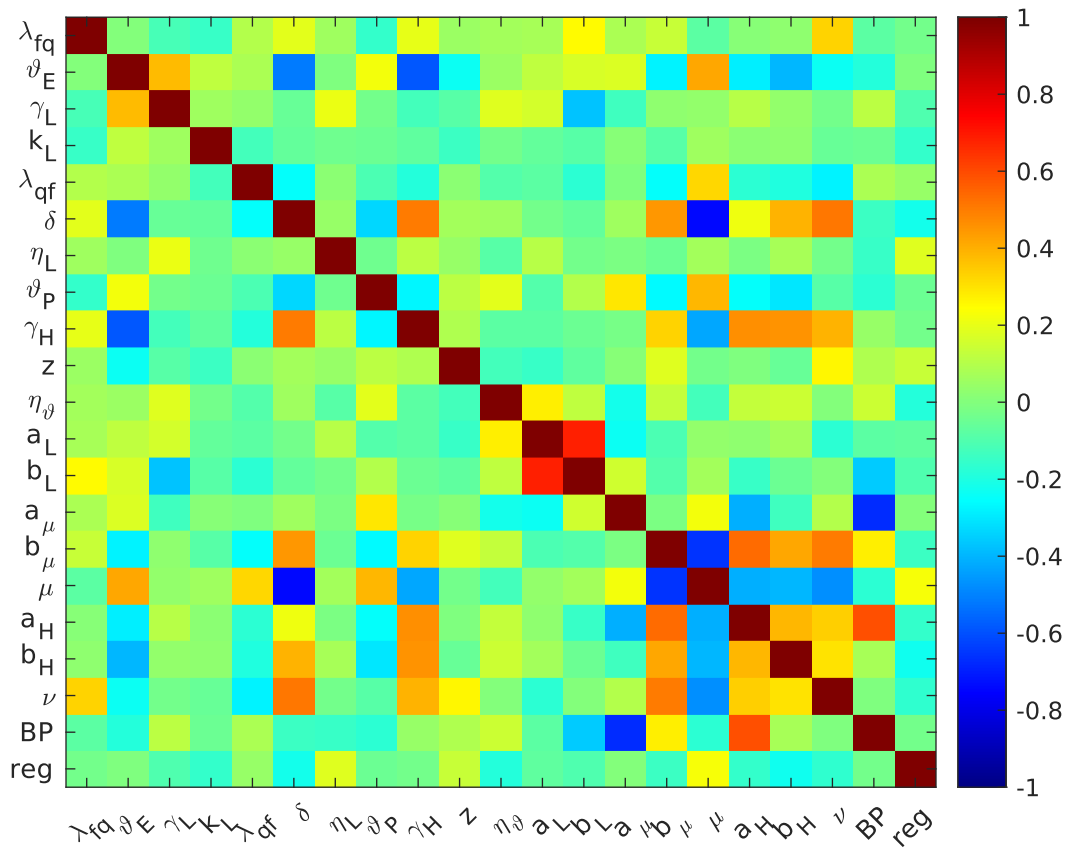
### 7.2. Estimated parameters with their intervals

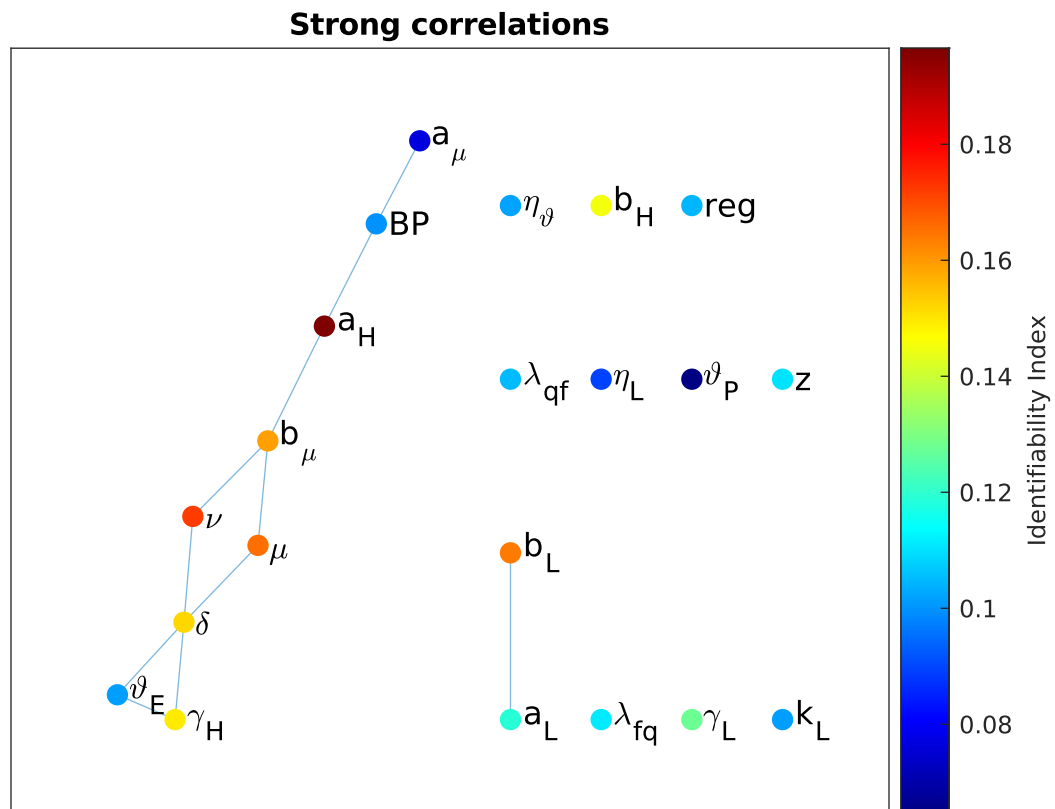
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.438'	'0.5613'	'0.4997'	'0.9995'	'0.1114'
\vartheta_E	'0'	'0.0027'	'0.0008'	'0.0212'	'0.1019'
\gamma_L	'0.4023'	'0.5548'	'0.4785'	'0.7199'	'0.128'
k_L	'4.8867'	'5.9843'	'5.4355'	'9.6253'	'0.1015'
\lambda_{qf}	'0.4501'	'0.5515'	'0.5008'	'1'	'0.105'
\delta	'0.0318'	'0.0387'	'0.0352'	'0.0017'	'0.1523'
\eta_L	'0.4499'	'0.5505'	'0.5002'	'0.1241'	'0.09'
\vartheta_P	'0'	'0.0001'	'0'	'0'	'0.0648'
\gamma_H	'0.9027'	'1'	'0.9851'	'0.6225'	'0.1497'
z	'12.2783'	'16.0892'	'14.1838'	'1.8943'	'0.1104'
\eta_{\vartheta}	'0.7654'	'0.8642'	'0.8148'	'0.8286'	'0.1021'
a_L	'4.012'	'5.4609'	'4.7365'	'10.4934'	'0.1192'
b_L	'6.7111'	'9.2668'	'7.9889'	'14.2889'	'0.1638'
a_{\mu}	'1'	'1.175'	'1.0054'	'1.0078'	'0.077'
b_{\mu}	'13.8423'	'15'	'14.9219'	'1.2074'	'0.1591'
\mu	'0'	'0.1085'	'0.0308'	'0.9995'	'0.1653'
a_H	'12.1514'	'14.7704'	'13.4609'	'13.1808'	'0.1966'
b_H	'12.6872'	'14.716'	'13.7016'	'2.2625'	'0.1455'
\nu	'196.8071'	'270.6541'	'233.7306'	'0.0008'	'0.172'
BP	'297.005'	'297.9948'	'297.4999'	'297.5'	'0.1002'
reg	'0.1115'	'0.1387'	'0.1251'	'0.0723'	'0.1046'

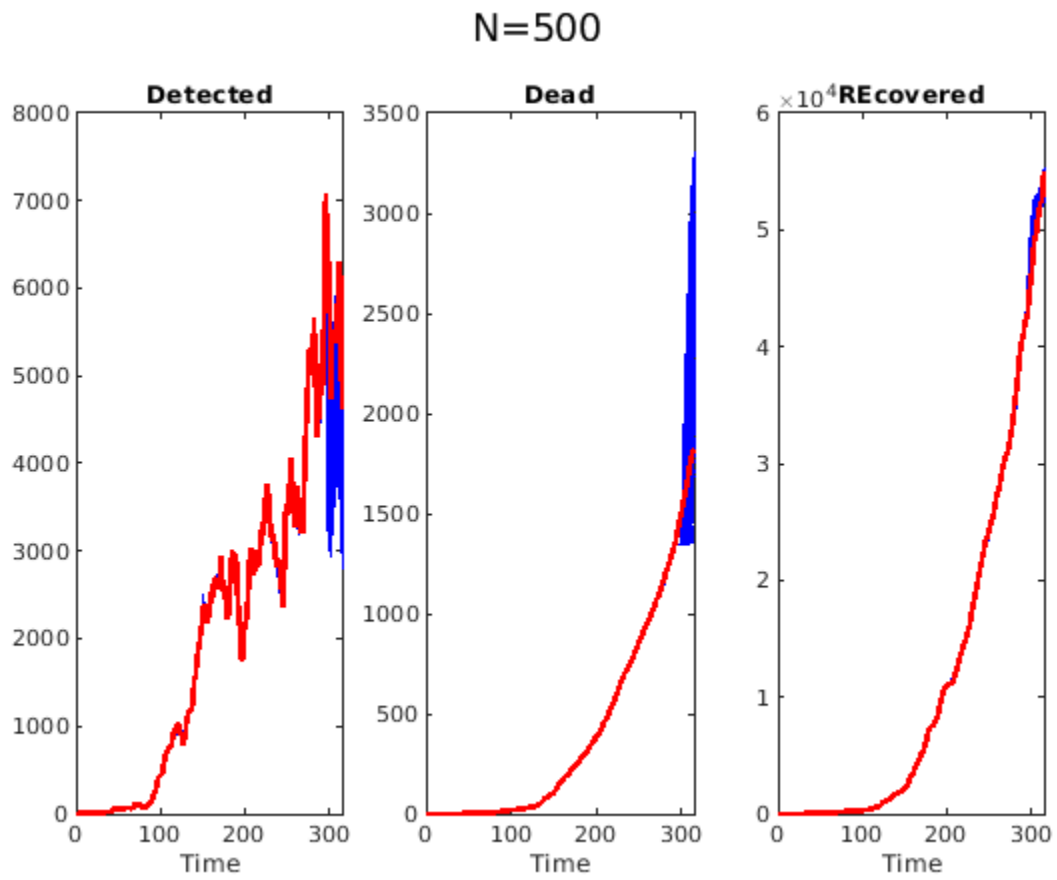
### 7.3. Identifiability analysis







## 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 data316 to the 333. The status of the validation is: COMPLETED.

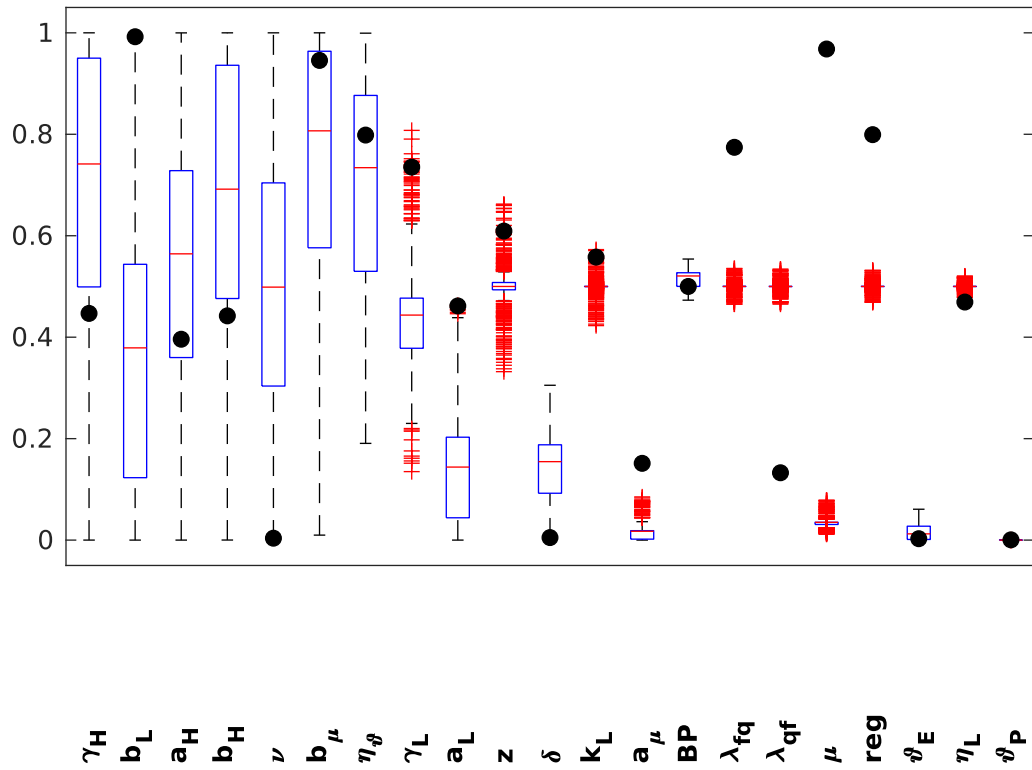
The number of estimations needed to perform the validation was1000.

### 8.2. Estimated parameters with their intervals

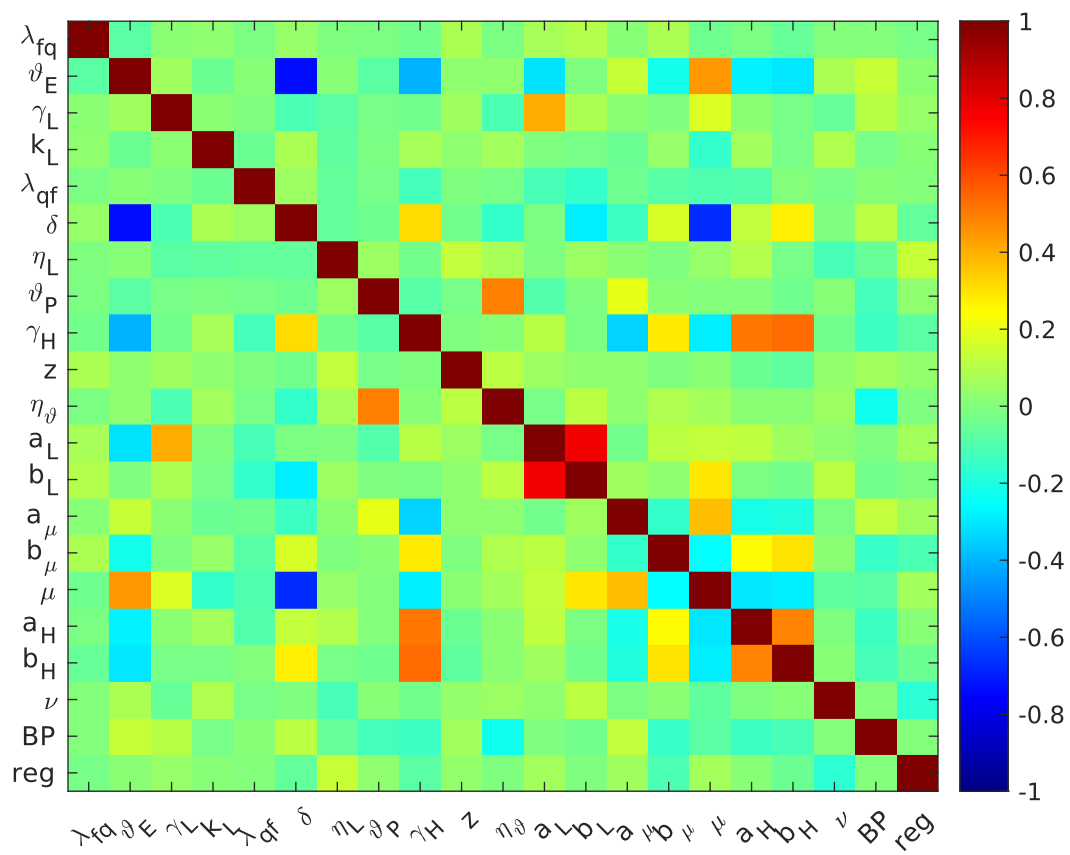
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

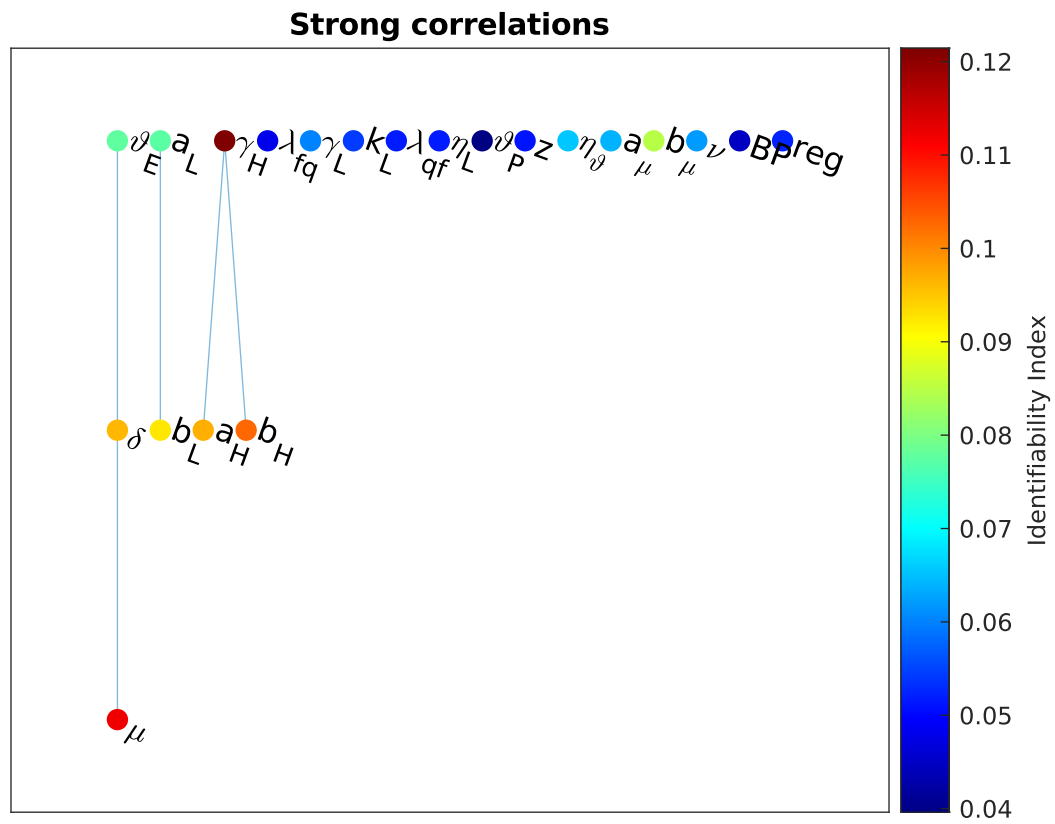
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.484'	'0.516'	'0.5'	'0.7743'	'0.0482'
$\vartheta_E$	'0.0107'	'0.0139'	'0.0123'	'0.0028'	'0.0779'
$\gamma_L$	'0.4239'	'0.4633'	'0.4436'	'0.7353'	'0.0603'
$k_L$	'5.3237'	'5.6753'	'5.4995'	'6.0208'	'0.0544'
$\lambda_{qf}$	'0.4835'	'0.5165'	'0.5'	'0.1327'	'0.0518'
$\delta$	'0.0221'	'0.0243'	'0.0232'	'0.0007'	'0.0963'
$\eta_L$	'0.485'	'0.515'	'0.5'	'0.4693'	'0.0519'
$\vartheta_P$	'0'	'0.0001'	'0'	'0.0005'	'0.0396'
$\gamma_H$	'0.7083'	'0.7746'	'0.7415'	'0.4469'	'0.1214'
$z$	'14.477'	'15.5232'	'15.0001'	'18.2755'	'0.0514'
$\eta_{\vartheta}$	'0.7127'	'0.7557'	'0.7342'	'0.7984'	'0.0656'
$a_L$	'2.8485'	'3.1822'	'3.0154'	'7.4625'	'0.0775'
$b_L$	'5.8753'	'6.7351'	'6.3052'	'14.892'	'0.0925'
$a_{\mu}$	'1.046'	'1.4418'	'1.2439'	'3.1187'	'0.0642'
$b_{\mu}$	'11.8366'	'12.7537'	'12.2952'	'14.2384'	'0.0848'
$\mu$	'0.0043'	'0.0658'	'0.0351'	'0.9681'	'0.1122'
$a_H$	'8.5074'	'9.2934'	'8.9004'	'6.5436'	'0.097'
$b_H$	'10.2231'	'11.1476'	'10.6854'	'7.1887'	'0.1029'
$\nu$	'235.6371'	'263.0618'	'249.3495'	'1.8723'	'0.0623'
BP	'315.2049'	'315.3263'	'315.2656'	'314.5002'	'0.045'
reg	'0.1206'	'0.1294'	'0.125'	'0.1998'	'0.0527'

### 8.3. Identifiability analysis

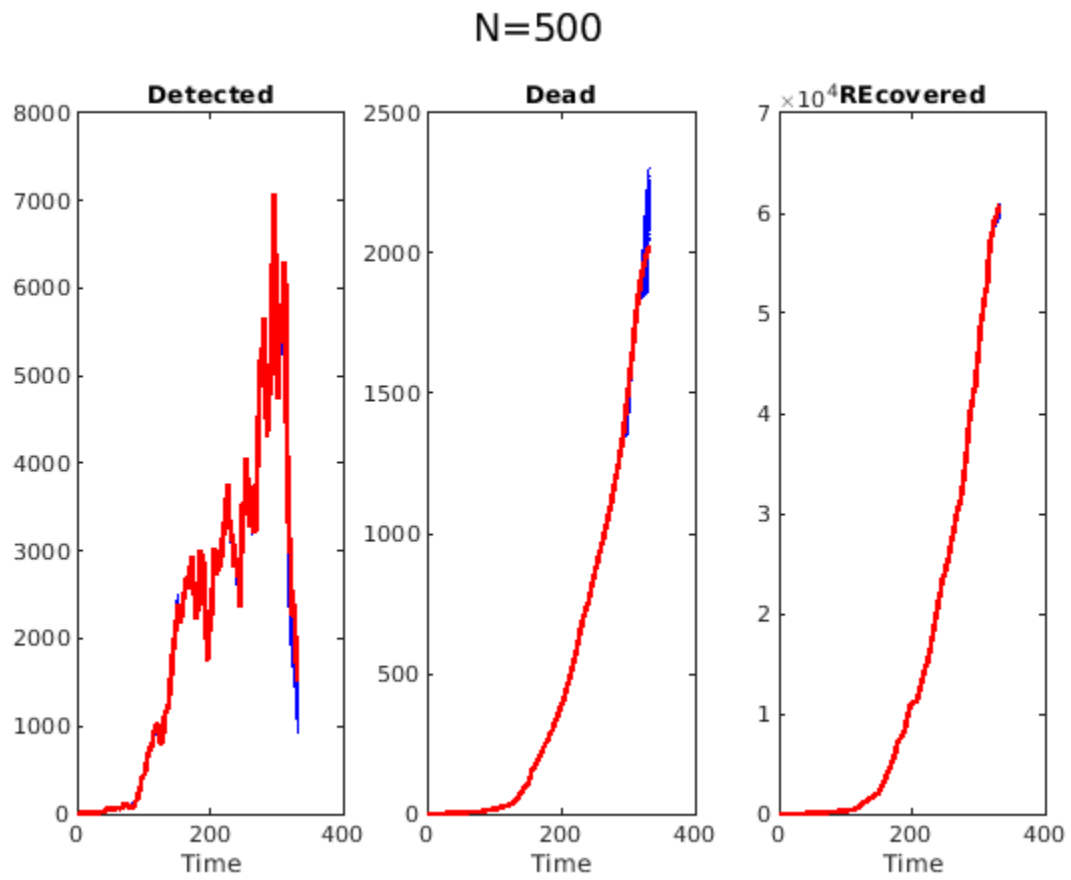








## 8.4. Uncertainty analysis



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## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data333 to the 350. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

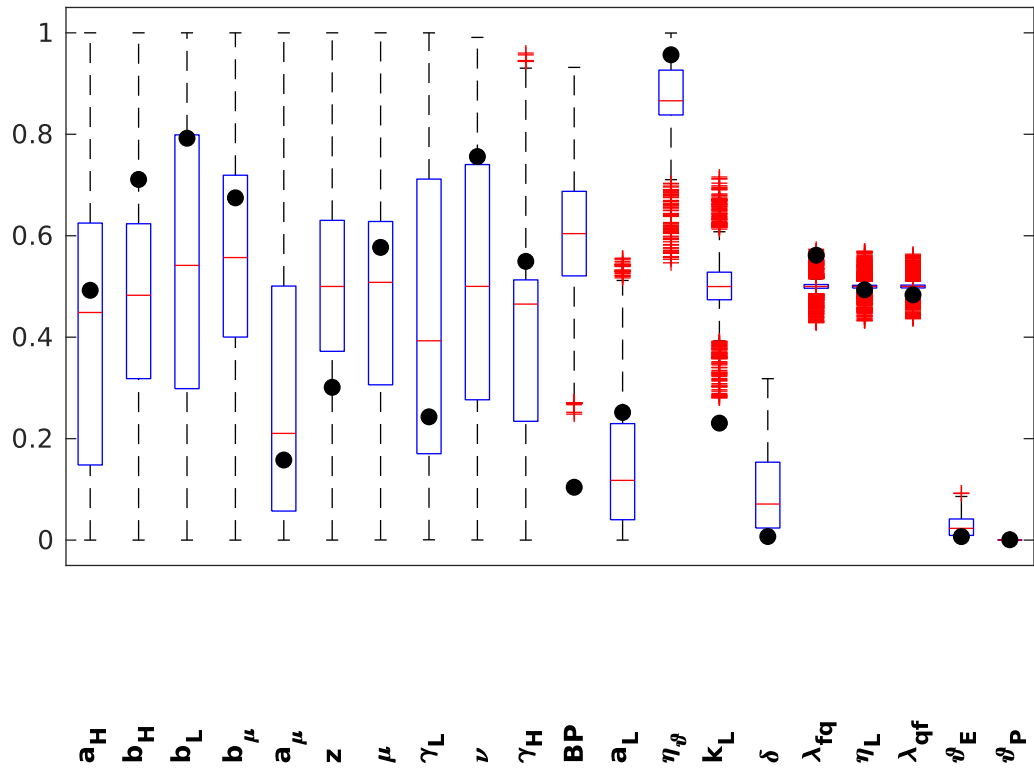
### 9.2. Estimated parameters with their intervals

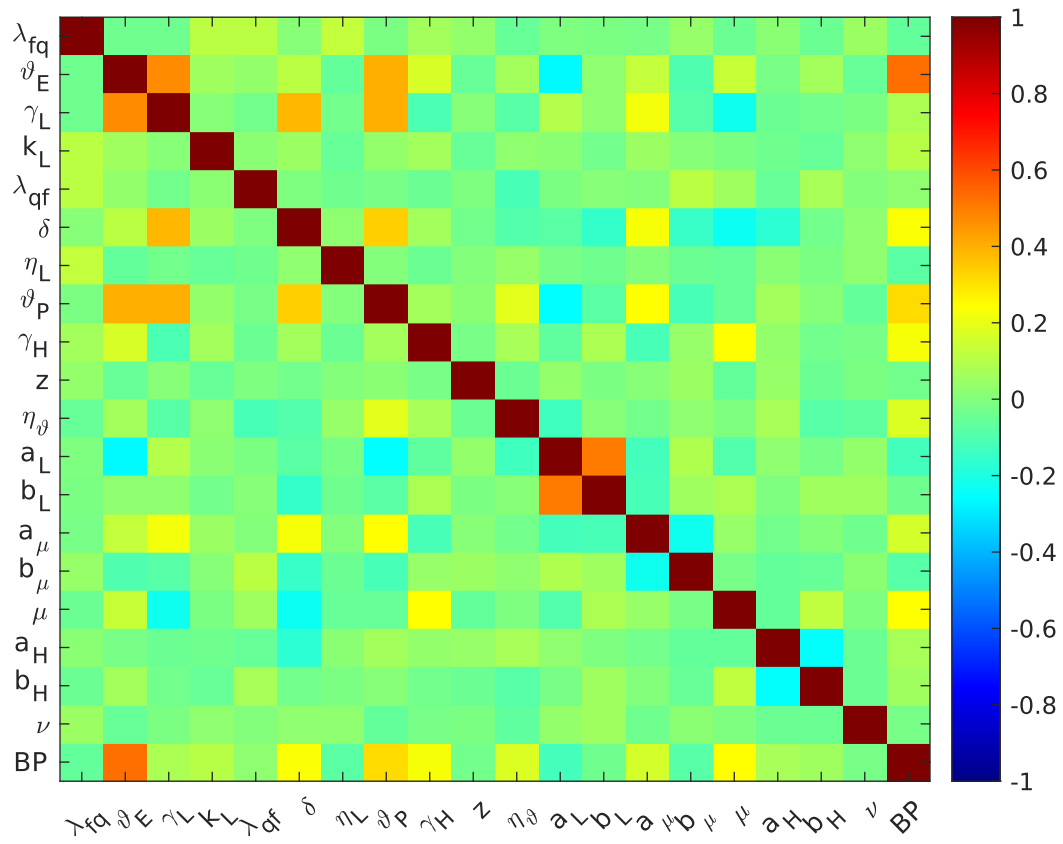
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

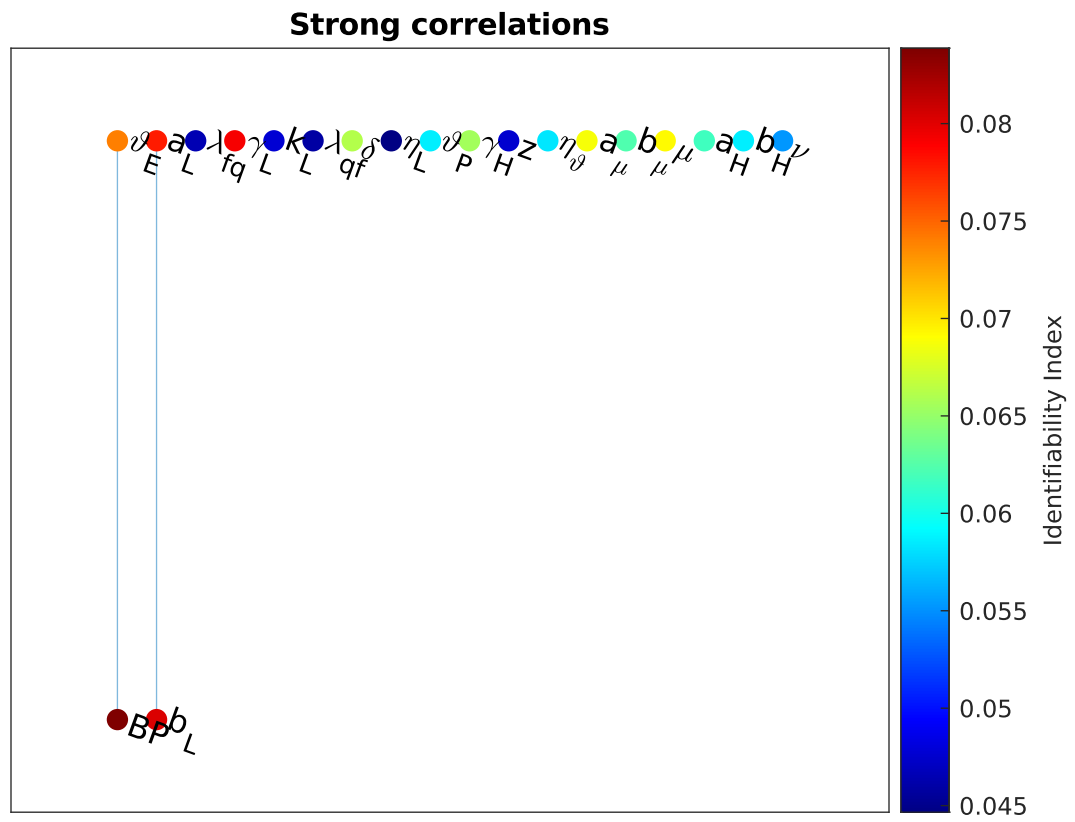
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.025'	'1'	'0.5'	'0.5616'	'0.0466'
$\vartheta_E$	'0.0033'	'0.0135'	'0.0232'	'0.0069'	'0.0741'
$\gamma_L$	'0.215'	'0.2729'	'0.393'	'0.243'	'0.0792'
$k_L$	'1'	'6.92'	'5.4985'	'3.0755'	'0.0477'
$\lambda_{qf}$	'0.05'	'1'	'0.5001'	'0.4835'	'0.0459'
$\delta$	'0.0001'	'0.0023'	'0.0107'	'0.0011'	'0.0662'
$\eta_L$	'0.0445'	'1'	'0.5'	'0.4934'	'0.0447'
$\vartheta_P$	'0.0005'	'0.001'	'0.0001'	'0.0007'	'0.0587'
$\gamma_H$	'0.0192'	'0.96'	'0.4654'	'0.5495'	'0.0656'
$z$	'0'	'20.3276'	'14.9997'	'9.0345'	'0.0476'
$\eta_{\vartheta}$	'0.904'	'0.9962'	'0.8658'	'0.9567'	'0.0584'
$a_L$	'3.5795'	'6.1688'	'2.6504'	'4.524'	'0.0778'
$b_L$	'9.4381'	'14.2302'	'8.5816'	'12.091'	'0.0802'
$a_{\mu}$	'1.28'	'15'	'3.9449'	'3.21'	'0.0688'
$b_{\mu}$	'1.28'	'15'	'8.7976'	'10.4461'	'0.0623'
$\mu$	'0.0177'	'0.8832'	'0.5081'	'0.577'	'0.0692'
$a_H$	'1'	'13.768'	'7.2819'	'7.8942'	'0.0618'
$b_H$	'1.28'	'14.4512'	'7.757'	'10.9533'	'0.0587'
$\nu$	'0.3109'	'500'	'250.0825'	'378.0403'	'0.0554'
BP	'317.8749'	'325.3861'	'330.5'	'318.5'	'0.0839'

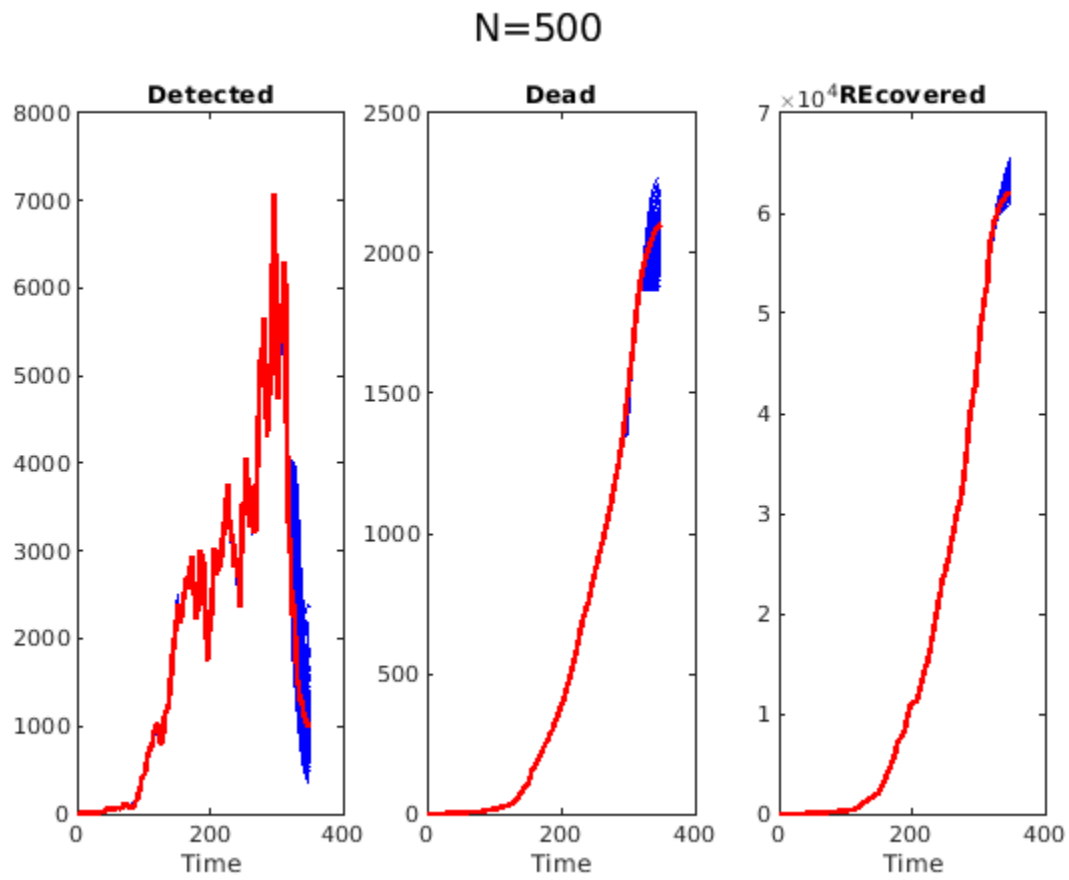
### 9.3. Identifiability analysis







## 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 data350 to the 433. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

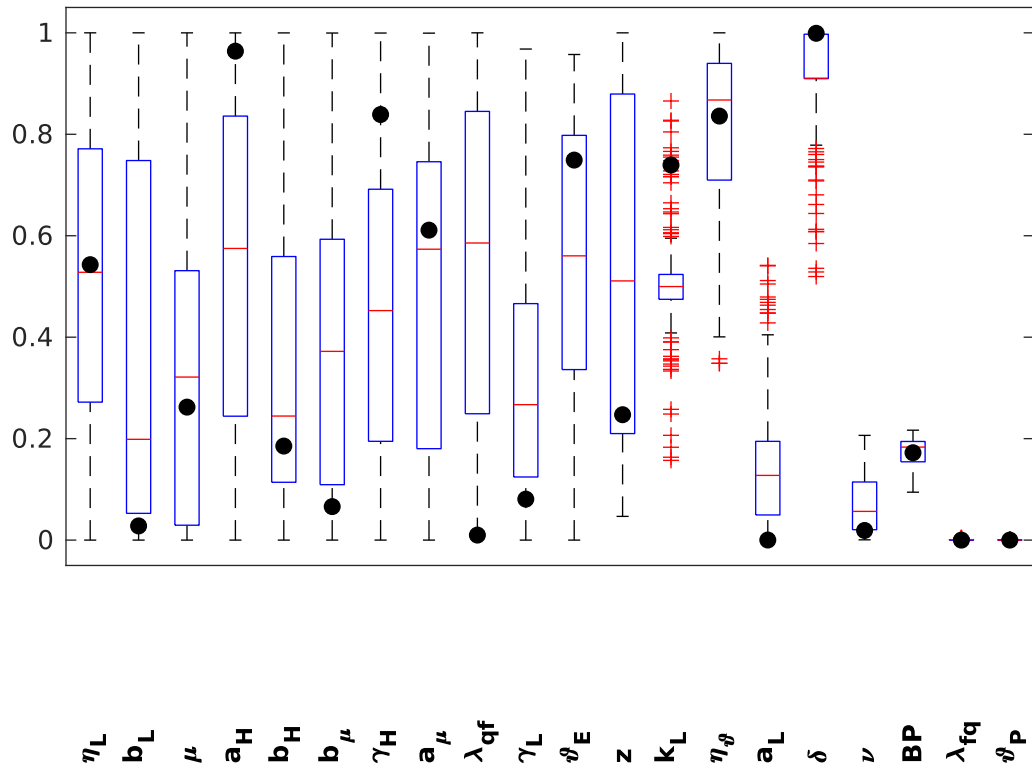
### 10.2. Estimated parameters with their intervals

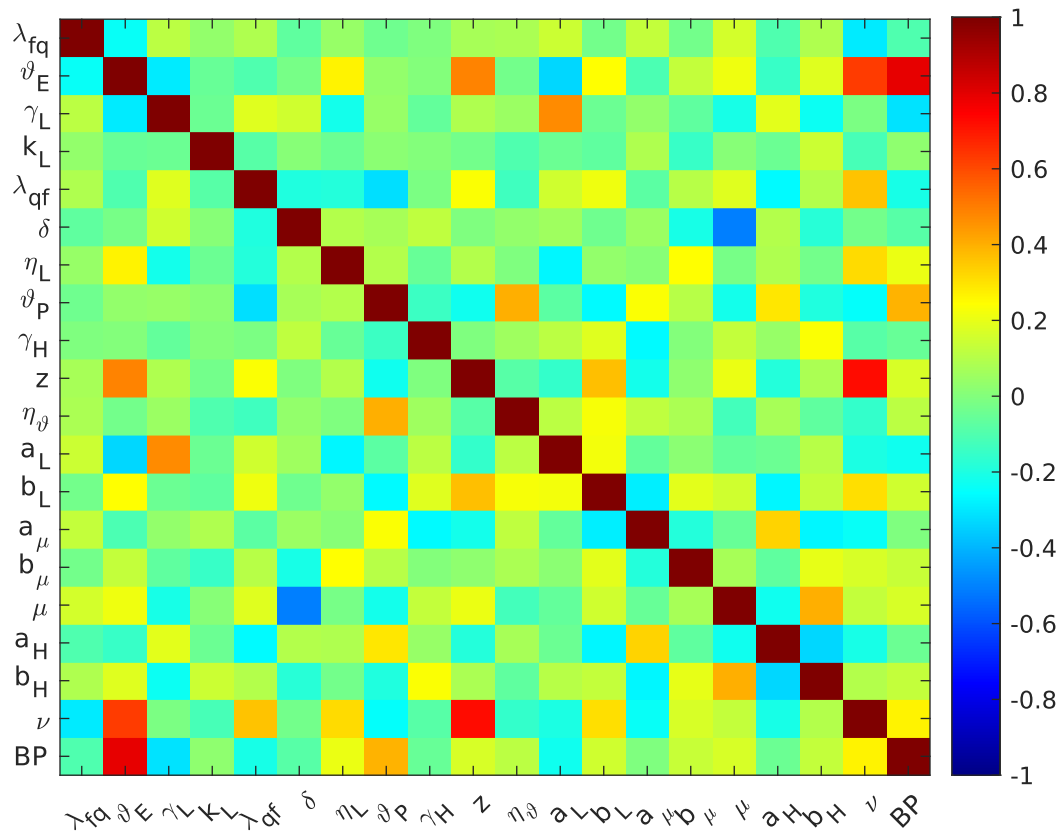
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

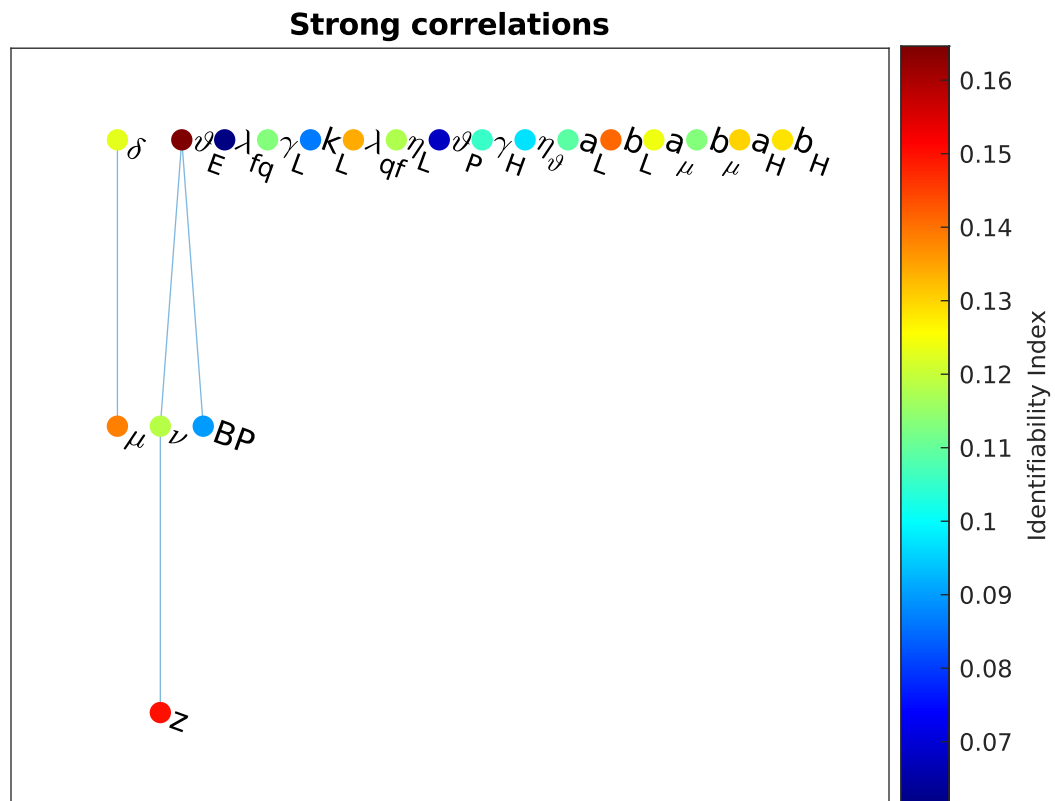
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0.0009'	'0'	'0.0615'
$\vartheta_E$	'0.6675'	'0.8085'	'0.5603'	'0.7491'	'0.1646'
$\gamma_L$	'0.0539'	'0.0906'	'0.2683'	'0.0808'	'0.1133'
$k_L$	'1'	'9.64'	'5.4983'	'7.655'	'0.0867'
$\lambda_{qf}$	'0.0048'	'0.0111'	'0.5857'	'0.0099'	'0.1342'
$\delta$	'0.021'	'0.15'	'0.1364'	'0.1499'	'0.1228'
$\eta_L$	'0.3526'	'0.9656'	'0.528'	'0.5429'	'0.1177'
$\vartheta_P$	'0'	'0'	'0.0003'	'0'	'0.0681'
$\gamma_H$	'0.018'	'0.9'	'0.4524'	'0.839'	'0.1057'
$z$	'5.8999'	'8.7366'	'15.3278'	'7.4154'	'0.1497'
$\eta_{\vartheta}$	'0.4829'	'1'	'0.8675'	'0.8359'	'0.0974'
$a_L$	'1'	'1.5621'	'2.7863'	'1.0018'	'0.1092'
$b_L$	'1.147'	'3.0309'	'3.7815'	'1.3911'	'0.141'
$a_{\mu}$	'1'	'15'	'9.028'	'9.5543'	'0.1243'
$b_{\mu}$	'1'	'14.44'	'6.2087'	'1.9244'	'0.1133'
$\mu$	'0'	'0.4841'	'0.3214'	'0.2622'	'0.1388'
$a_H$	'1'	'15'	'9.0496'	'14.4938'	'0.13'
$b_H$	'1.896'	'15'	'4.4236'	'3.5951'	'0.1285'
$\nu$	'8.7823'	'13.7477'	'28.2987'	'9.492'	'0.1186'
BP	'345.5802'	'349.2073'	'349.4998'	'348.5'	'0.09'

### 10.3. Identifiability analysis

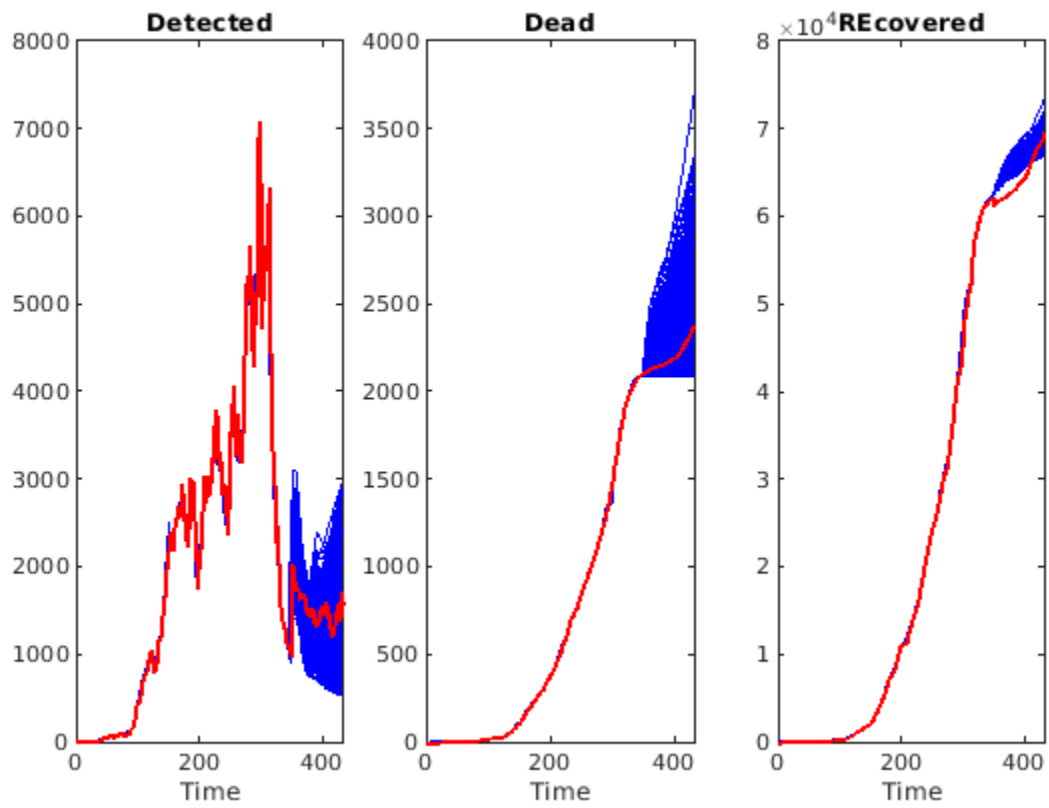






## 10.4. Uncertainty analysis

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 data433 to the 454. The status of the validation is: COMPLETED.

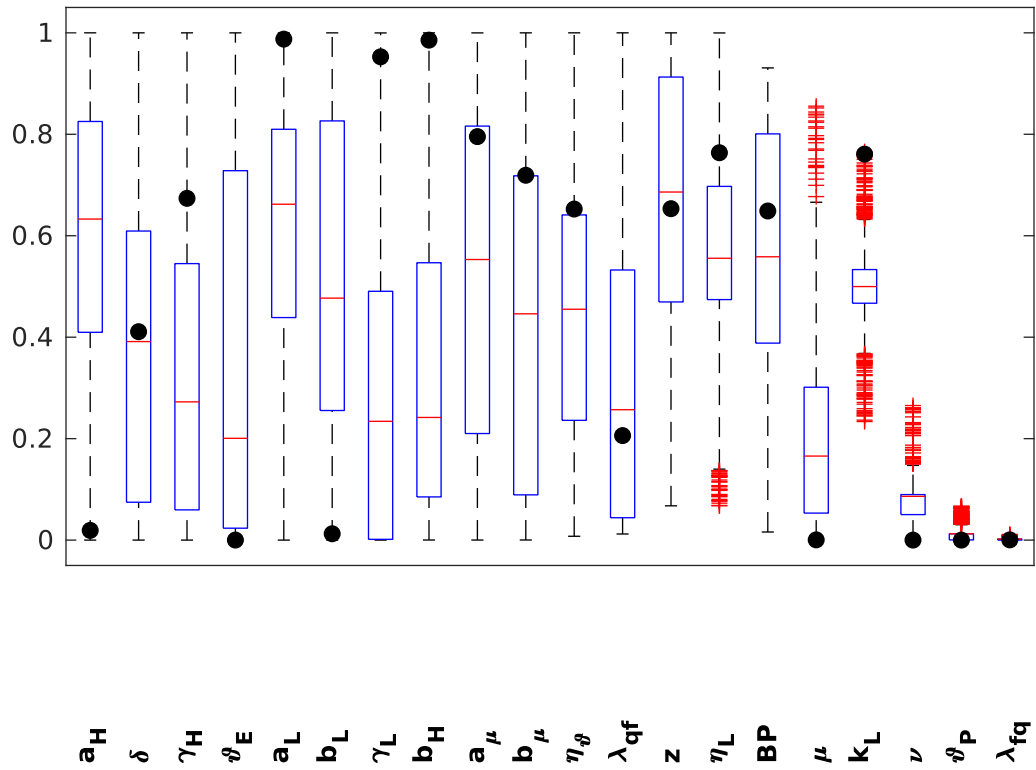
The number of estimations needed to perform the validation was1000.

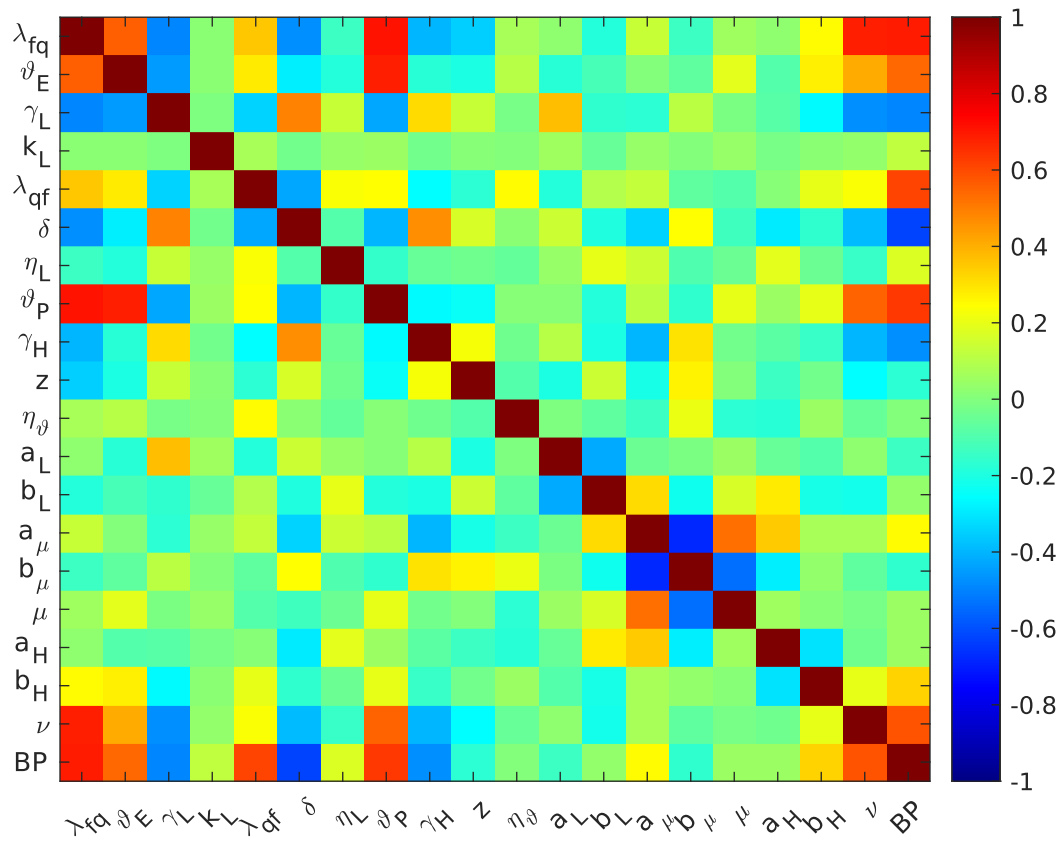
### 11.2. Estimated parameters with their intervals

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

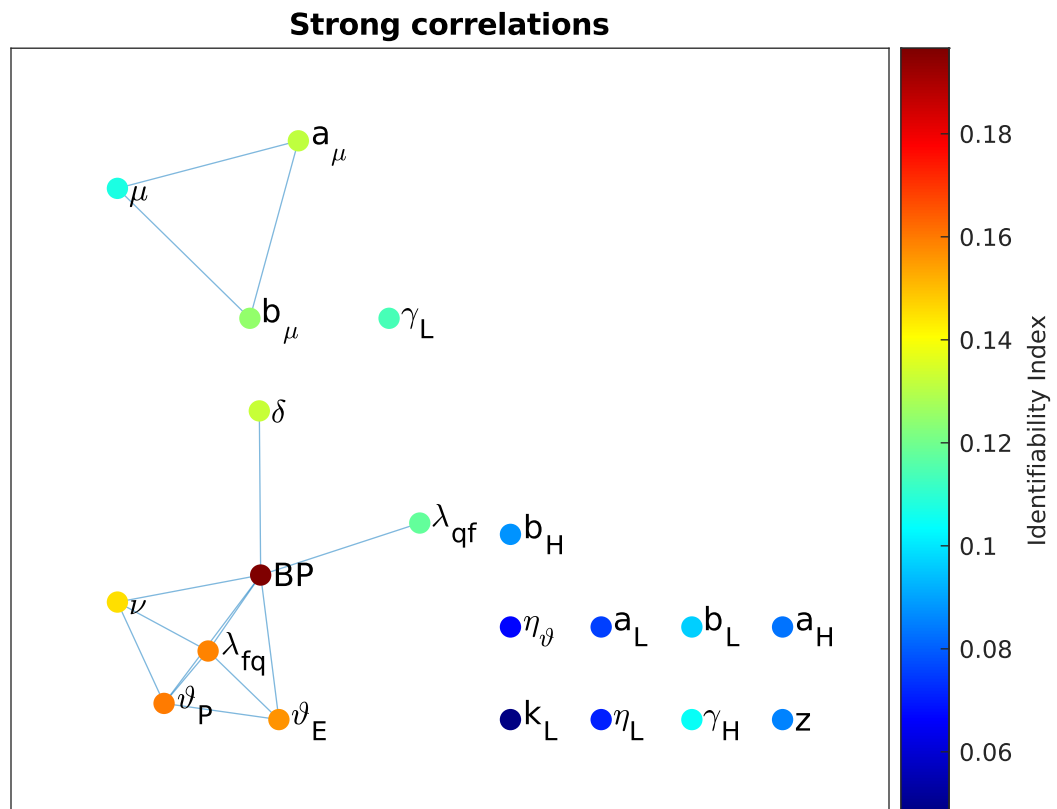
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0232'	'0.0021'	'0.0005'	'0.1588'
\vartheta_E	'0.1669'	'0.2344'	'0.2006'	'0.0001'	'0.1565'
\gamma_L	'0.2067'	'0.2616'	'0.2342'	'0.9527'	'0.1142'
k_L	'5.3638'	'5.6325'	'5.4981'	'7.8482'	'0.0483'
\lambda_{qf}	'0.2298'	'0.2843'	'0.257'	'0.206'	'0.1181'
\delta	'0.0544'	'0.063'	'0.0587'	'0.0616'	'0.1327'
\eta_L	'0.537'	'0.5742'	'0.5556'	'0.7636'	'0.0713'
\vartheta_P	'0'	'0.0381'	'0.0124'	'0'	'0.16'
\gamma_H	'0.2465'	'0.2985'	'0.2725'	'0.6737'	'0.1048'
z	'19.9008'	'21.2684'	'20.5846'	'19.5987'	'0.0856'
\eta_{\vartheta}	'0.4324'	'0.4778'	'0.4551'	'0.6526'	'0.0669'
a_L	'9.9391'	'10.6002'	'10.2697'	'14.8263'	'0.0757'
b_L	'7.2811'	'8.0748'	'7.6779'	'1.1747'	'0.0966'
a_{\mu}	'8.331'	'9.1564'	'8.7437'	'12.1357'	'0.1312'
b_{\mu}	'6.8342'	'7.6553'	'7.2448'	'11.0691'	'0.1252'
\mu	'0.138'	'0.1934'	'0.1657'	'0.0005'	'0.1076'
a_H	'9.4972'	'10.2234'	'9.8603'	'1.2682'	'0.0833'
b_H	'4.0097'	'4.7598'	'4.3847'	'14.7985'	'0.0881'
\nu	'31.8559'	'54.3918'	'43.1238'	'0.0027'	'0.1454'
BP	'400.629'	'404.371'	'402.5'	'410.9844'	'0.1966'

### 11.3. Identifiability analysis



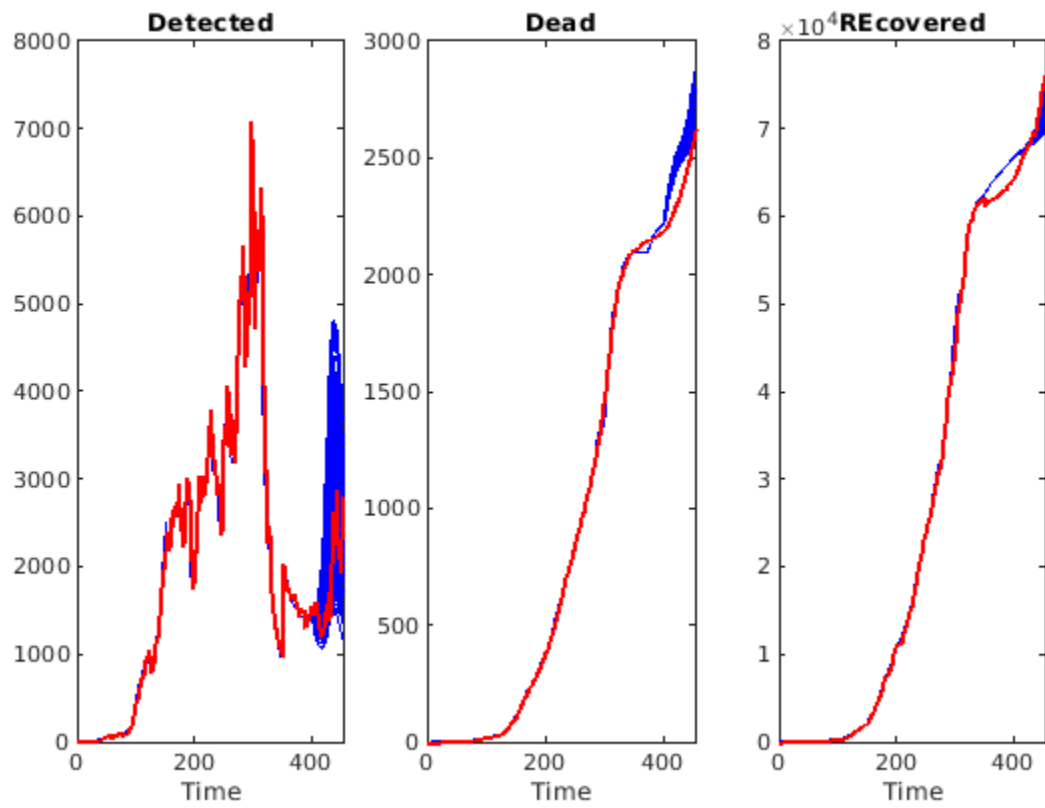






## 11.4. Uncertainty analysis

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 data454 to the 475. The status of the validation is: COMPLETED.

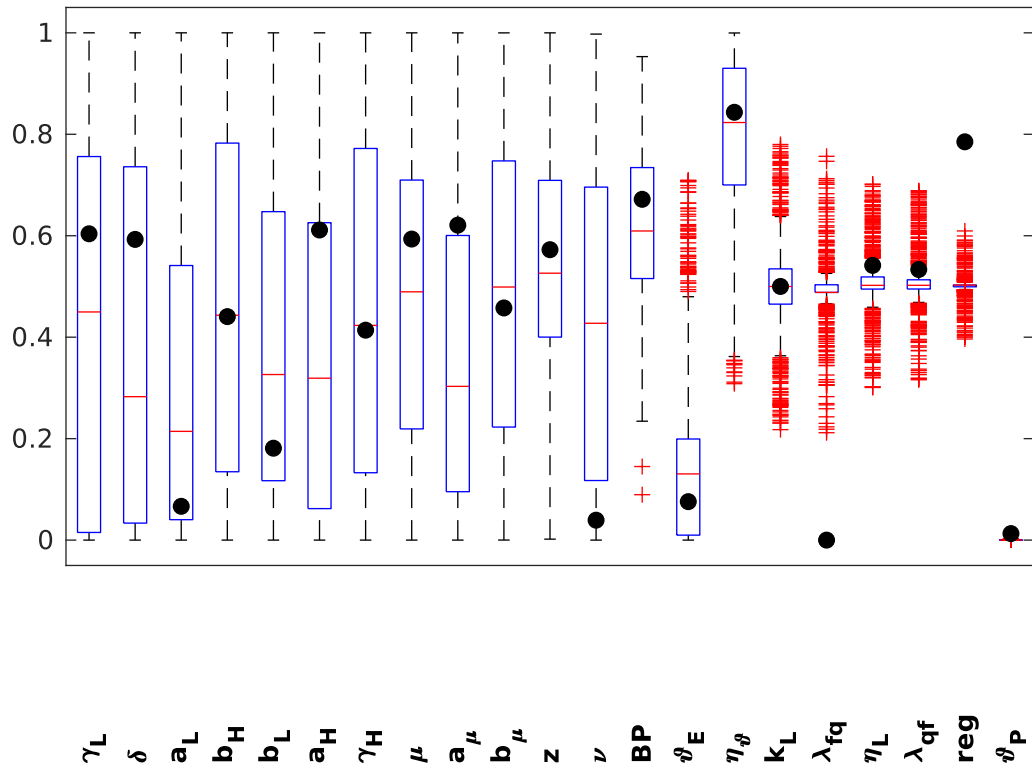
The number of estimations needed to perform the validation was1000.

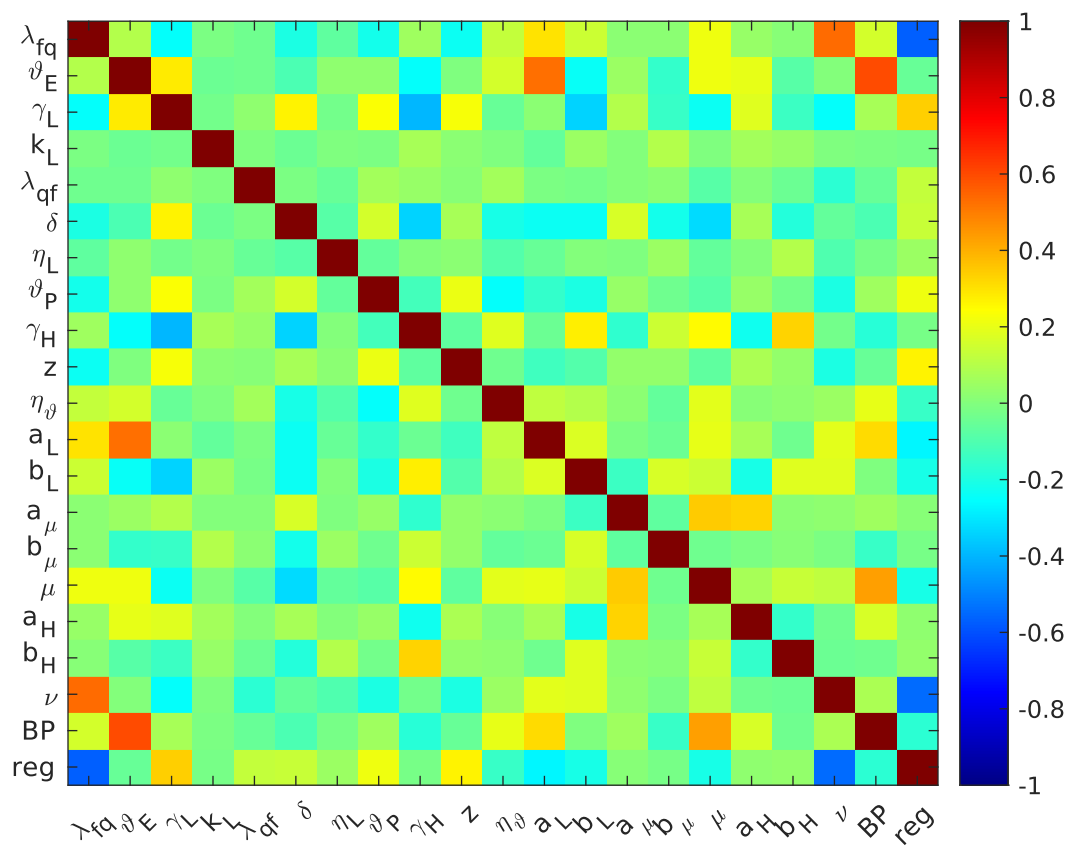
### 12.2. Estimated parameters with their intervals

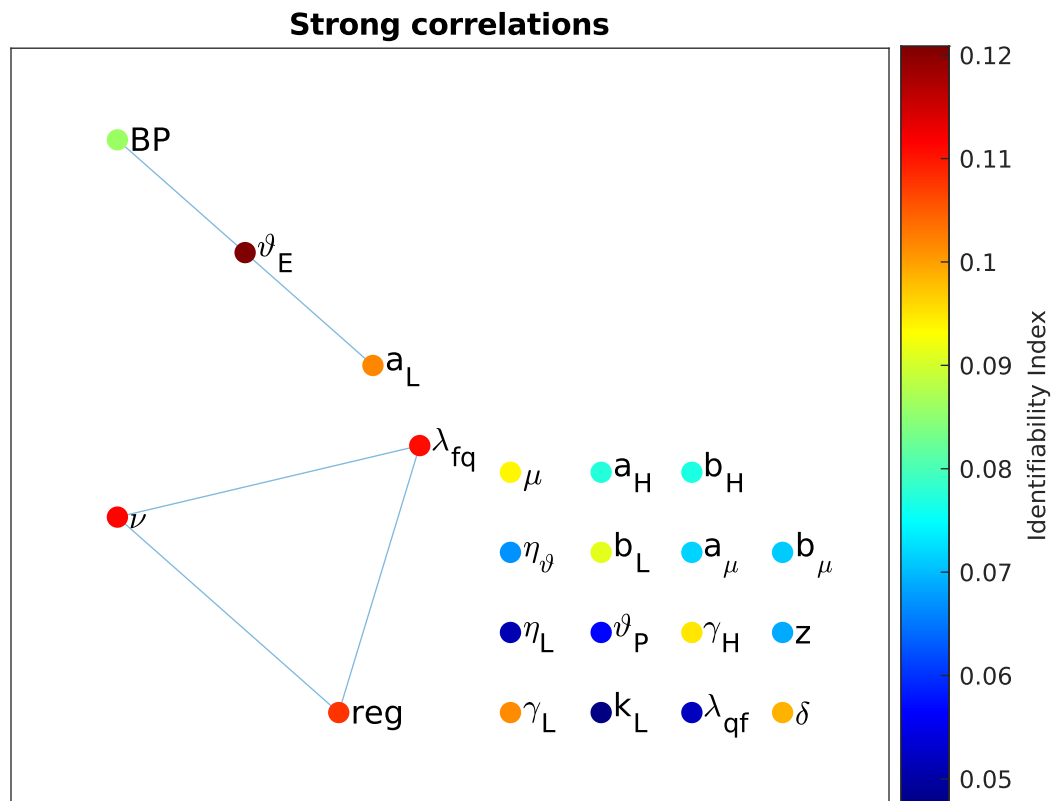
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4645'	'0.5121'	'0.4883'	'0'	'0.1108'
\vartheta_E	'0.0954'	'0.1668'	'0.1311'	'0.0758'	'0.1209'
\gamma_L	'0.415'	'0.4845'	'0.4498'	'0.6038'	'0.1016'
k_L	'5.3524'	'5.6476'	'5.5'	'5.5002'	'0.0476'
\lambda_{qf}	'0.4845'	'0.5201'	'0.5023'	'0.5334'	'0.052'
\delta	'0.037'	'0.0479'	'0.0424'	'0.0889'	'0.0986'
\eta_L	'0.485'	'0.5194'	'0.5022'	'0.5416'	'0.0512'
\vartheta_P	'0'	'0.0086'	'0.0003'	'0.0128'	'0.0568'
\gamma_H	'0.3901'	'0.4565'	'0.4233'	'0.4138'	'0.0951'
z	'15.1094'	'16.4603'	'15.7849'	'17.1748'	'0.0688'
\eta_{\vartheta}	'0.8045'	'0.8415'	'0.823'	'0.8434'	'0.0672'
a_L	'3.5692'	'4.4325'	'4.0009'	'1.9326'	'0.1018'
b_L	'5.1419'	'5.9971'	'5.5695'	'3.5361'	'0.0913'
a_{\mu}	'4.8435'	'5.6425'	'5.243'	'9.6927'	'0.0718'
b_{\mu}	'7.5661'	'8.4026'	'7.9843'	'7.4072'	'0.0713'
\mu	'0.46'	'0.5189'	'0.4894'	'0.5935'	'0.0939'
a_H	'5.0533'	'5.8832'	'5.4682'	'9.5579'	'0.0775'
b_H	'6.7429'	'7.6697'	'7.2063'	'7.1676'	'0.0769'
\nu	'198.6342'	'228.8113'	'213.7228'	'19.6388'	'0.1112'
BP	'451.9972'	'453.0028'	'452.5'	'454.4984'	'0.0861'
reg	'0.1209'	'0.1306'	'0.1257'	'0.1963'	'0.1077'

### 12.3. Identifiability analysis

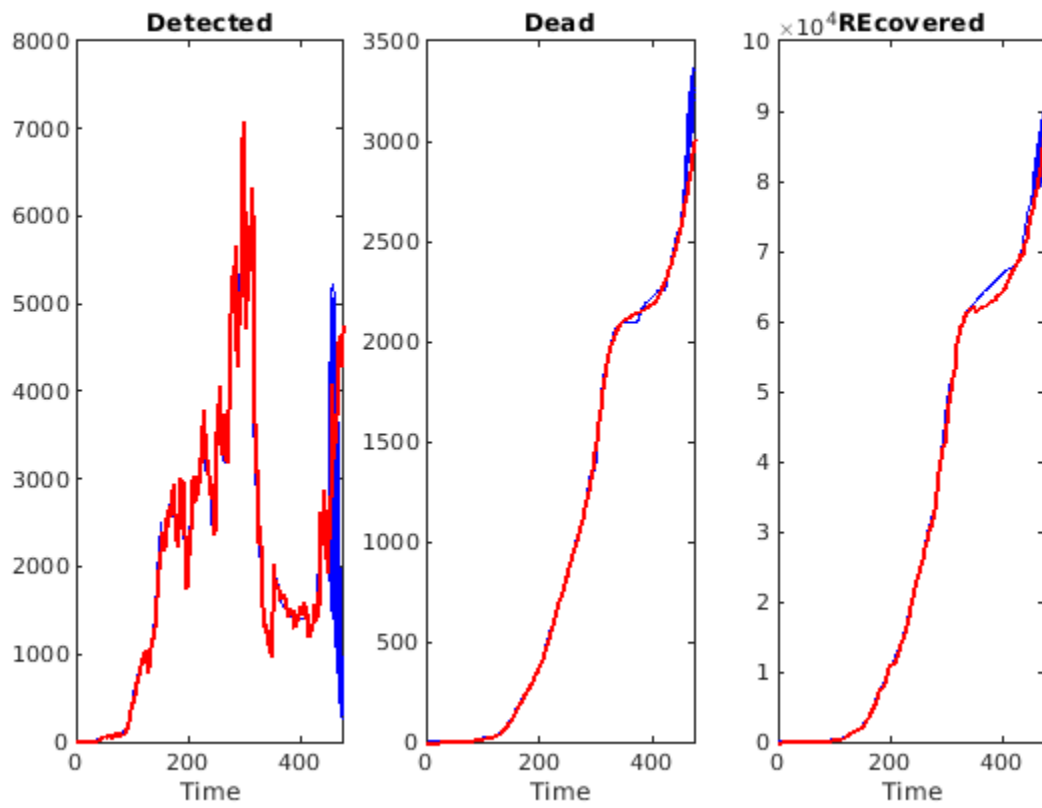






## 12.4. Uncertainty analysis

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 data475 to the 482. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

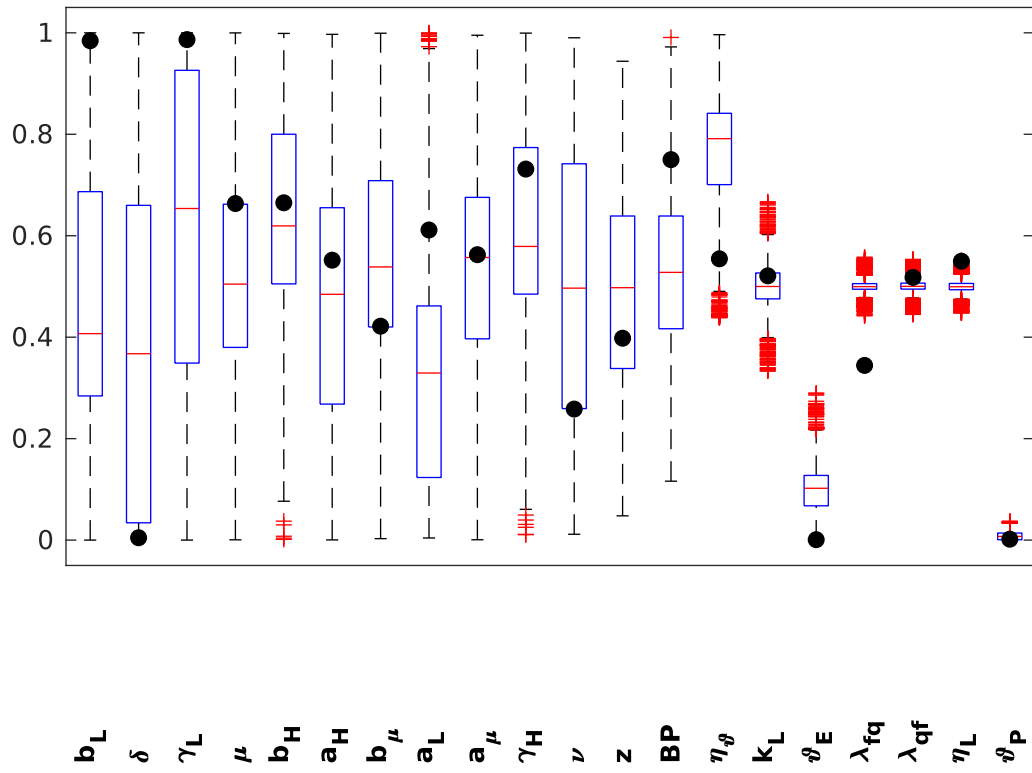
### 13.2. Estimated parameters with their intervals

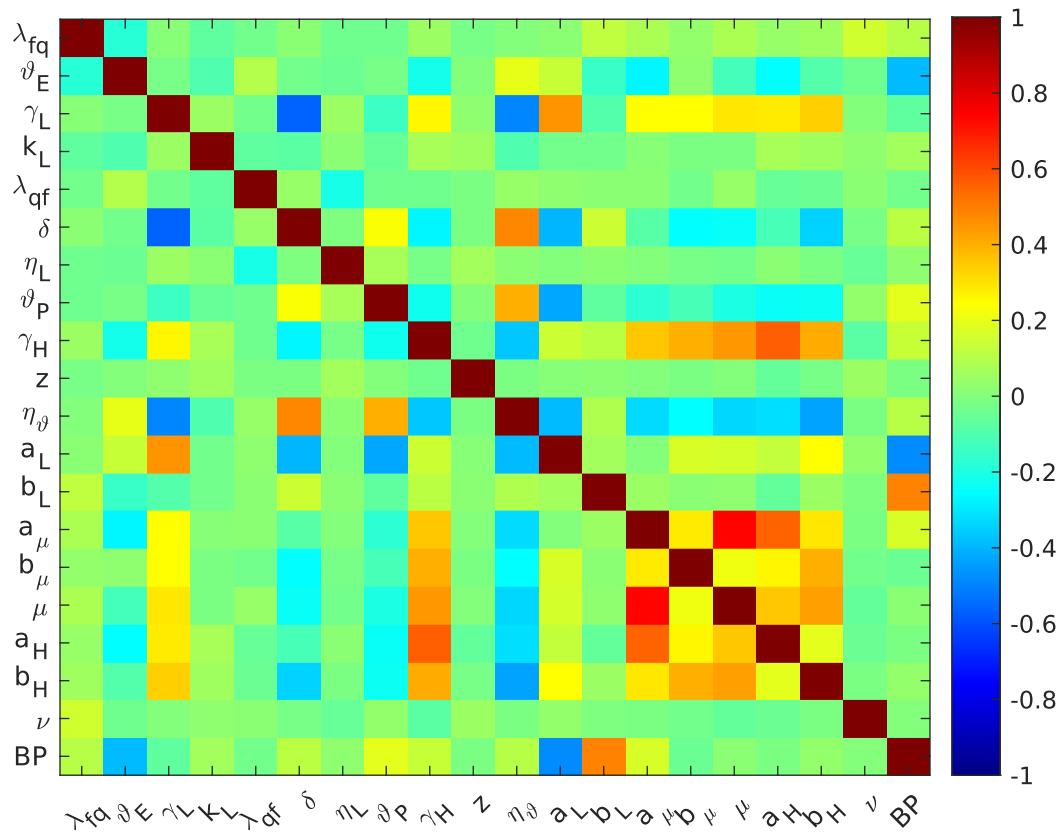
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

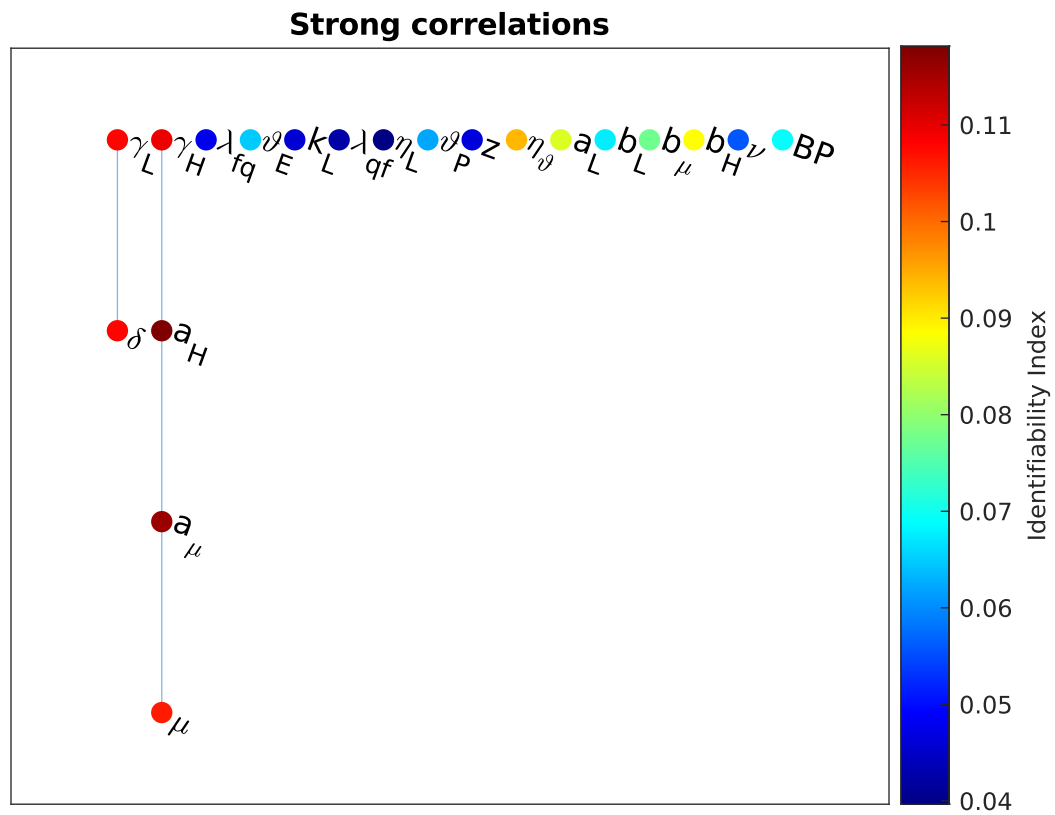
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.4906'	'0.5087'	'0.4997'	'0.3444'	'0.0482'
$\vartheta_E$	'0.0917'	'0.1127'	'0.1022'	'0.0008'	'0.065'
$\gamma_L$	'0.6291'	'0.6783'	'0.6537'	'0.9866'	'0.1079'
$k_L$	'5.4202'	'5.579'	'5.4996'	'5.6885'	'0.0461'
$\lambda_{qf}$	'0.4936'	'0.5069'	'0.5002'	'0.5179'	'0.0425'
$\delta$	'0.051'	'0.0592'	'0.0551'	'0.0007'	'0.1078'
$\eta_L$	'0.4939'	'0.505'	'0.4995'	'0.5497'	'0.0397'
$\vartheta_P$	'0.0062'	'0.0085'	'0.0073'	'0.0018'	'0.0622'
$\gamma_H$	'0.5595'	'0.5983'	'0.5789'	'0.7314'	'0.1094'
$z$	'14.4437'	'15.41'	'14.9268'	'11.9395'	'0.0466'
$\eta_{\vartheta}$	'0.7765'	'0.8061'	'0.7913'	'0.5545'	'0.0942'
$a_L$	'5.34'	'5.8833'	'5.6116'	'9.5584'	'0.0858'
$b_L$	'6.3845'	'7.0111'	'6.6978'	'14.7819'	'0.0678'
$a_{\mu}$	'8.5178'	'9.0814'	'8.7996'	'8.8764'	'0.1159'
$b_{\mu}$	'8.2945'	'8.7829'	'8.5387'	'6.9038'	'0.0776'
$\mu$	'0.4837'	'0.5256'	'0.5046'	'0.6635'	'0.106'
$a_H$	'7.4602'	'8.1063'	'7.7833'	'8.7255'	'0.1182'
$b_H$	'9.4295'	'9.913'	'9.6713'	'10.3094'	'0.0886'
$\nu$	'236.9261'	'259.7407'	'248.3334'	'129.1369'	'0.0561'
BP	'463.2633'	'463.7367'	'463.5'	'467.5'	'0.0691'



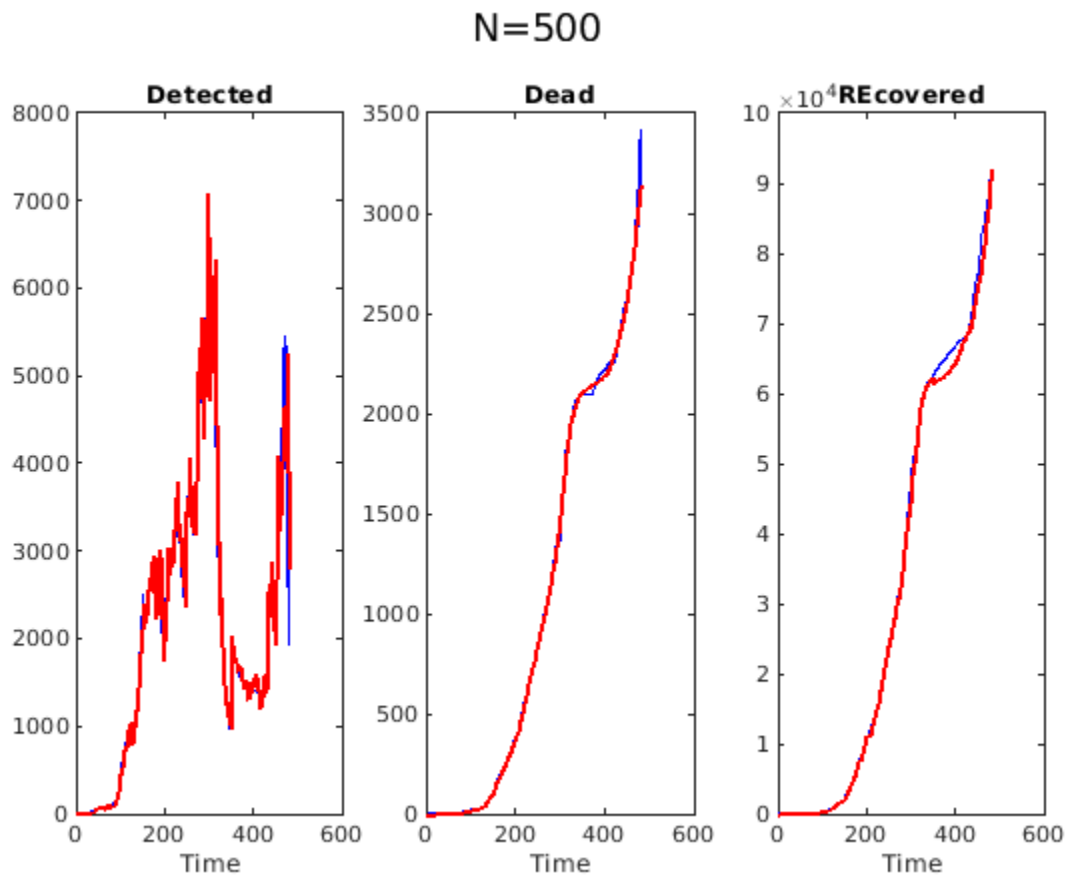
### 13.3. Identifiability analysis







### 13.4. Uncertainty analysis



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## Chapter 14. Extension number14

### 14.1. Basic information

The extension to be validated consists of the time series from the data482 to the 555. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

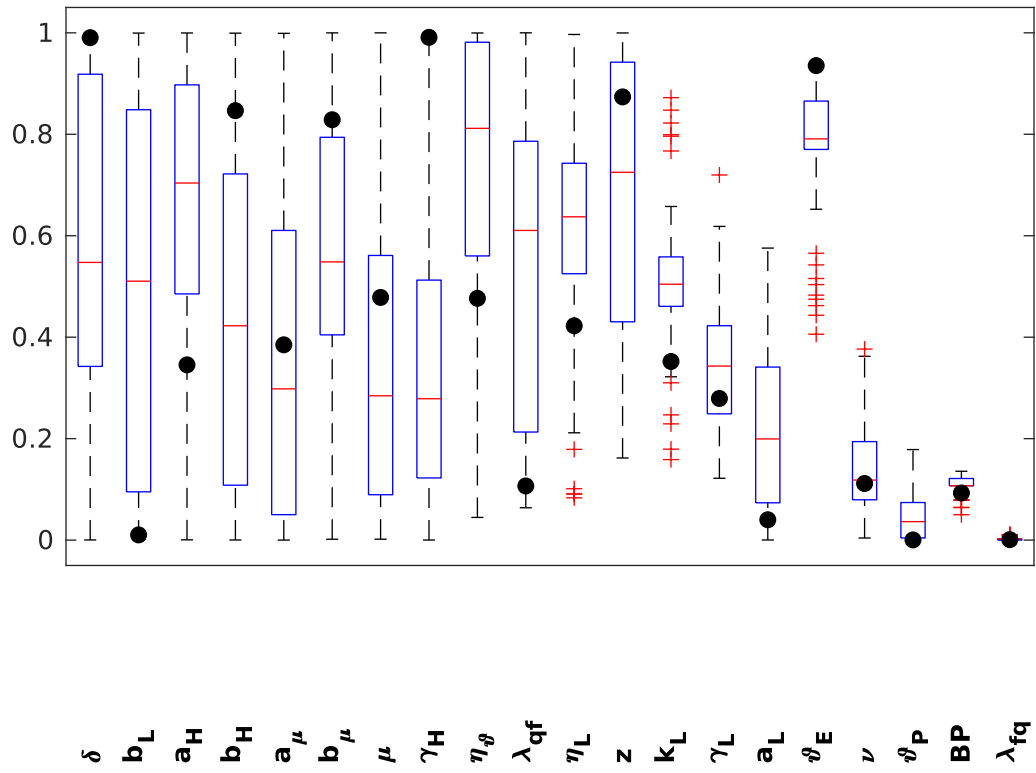
### 14.2. Estimated parameters with their intervals

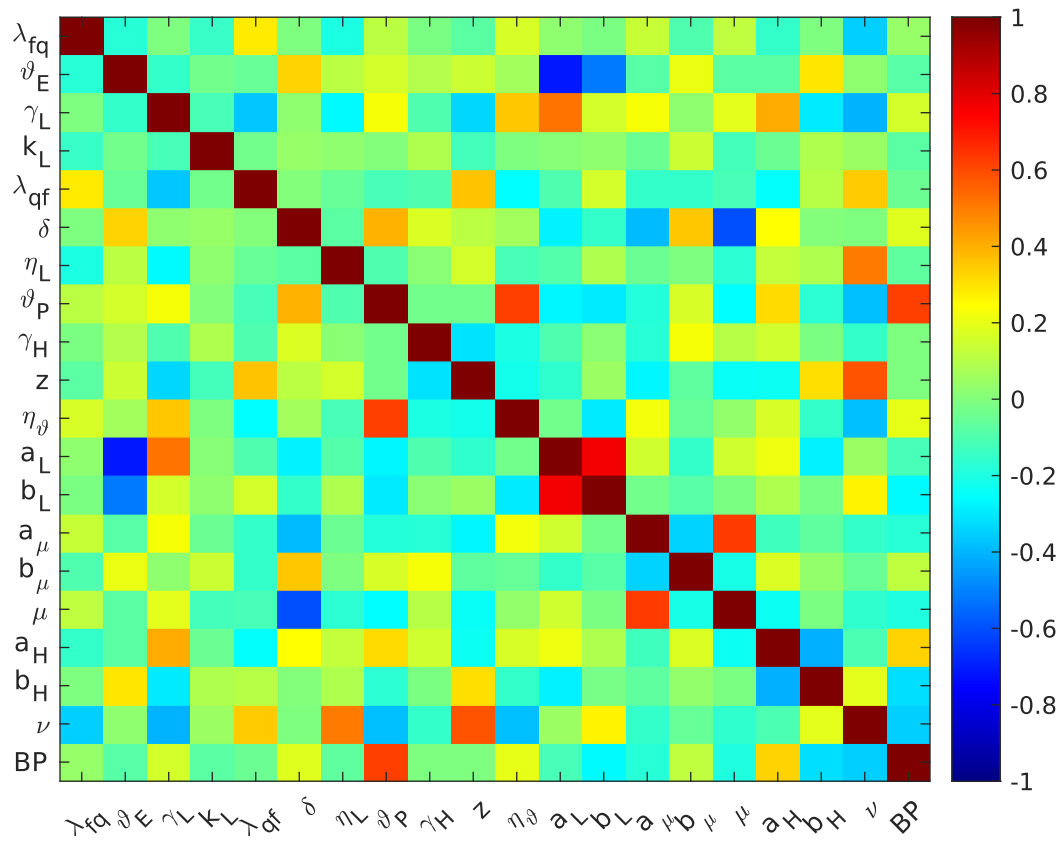
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

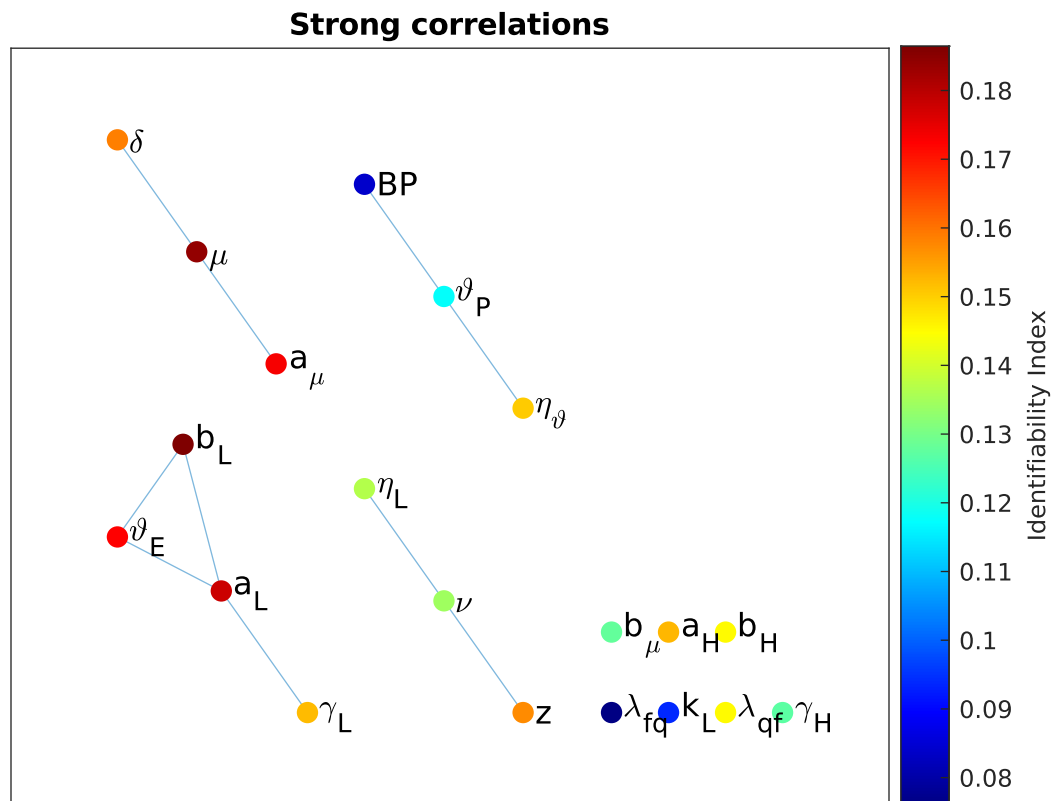
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0001'	'0.002'	'0.0023'	'0.0009'	'0.0761'
$\vartheta_E$	'0.9038'	'0.9546'	'0.7909'	'0.9354'	'0.1722'
$\gamma_L$	'0.2054'	'0.3267'	'0.3431'	'0.2793'	'0.1522'
$k_L$	'1'	'10'	'5.5401'	'4.1692'	'0.0942'
$\lambda_{qf}$	'0.0639'	'0.2334'	'0.6104'	'0.1068'	'0.1454'
$\delta$	'0.015'	'0.15'	'0.0821'	'0.1486'	'0.1585'
$\eta_L$	'0.3867'	'0.592'	'0.6373'	'0.4225'	'0.1366'
$\vartheta_P$	'0'	'0.0009'	'0.0364'	'0.0004'	'0.1177'
$\gamma_H$	'0'	'1'	'0.2787'	'0.9911'	'0.1272'
$z$	'18.1377'	'26.3217'	'21.7524'	'26.2112'	'0.1575'
$\eta_{\vartheta}$	'0.4369'	'0.9775'	'0.8117'	'0.4766'	'0.1506'
$a_L$	'1.3255'	'1.8655'	'3.7914'	'1.5617'	'0.1781'
$b_L$	'1.0684'	'2.0216'	'8.1461'	'1.1436'	'0.1864'
$a_{\mu}$	'1'	'14.3'	'5.174'	'6.3895'	'0.1734'
$b_{\mu}$	'1'	'14.44'	'8.6779'	'12.6015'	'0.1282'
$\mu$	'0'	'0.95'	'0.2844'	'0.4784'	'0.1842'
$a_H$	'1'	'13.9024'	'10.8548'	'5.837'	'0.1528'
$b_H$	'1.28'	'15'	'6.9152'	'12.8524'	'0.1455'
$\nu$	'54.449'	'71.3596'	'59.1794'	'55.7824'	'0.1346'
BP	'479.8125'	'481.6903'	'482.5'	'481.4999'	'0.084'

### 14.3. Identifiability analysis

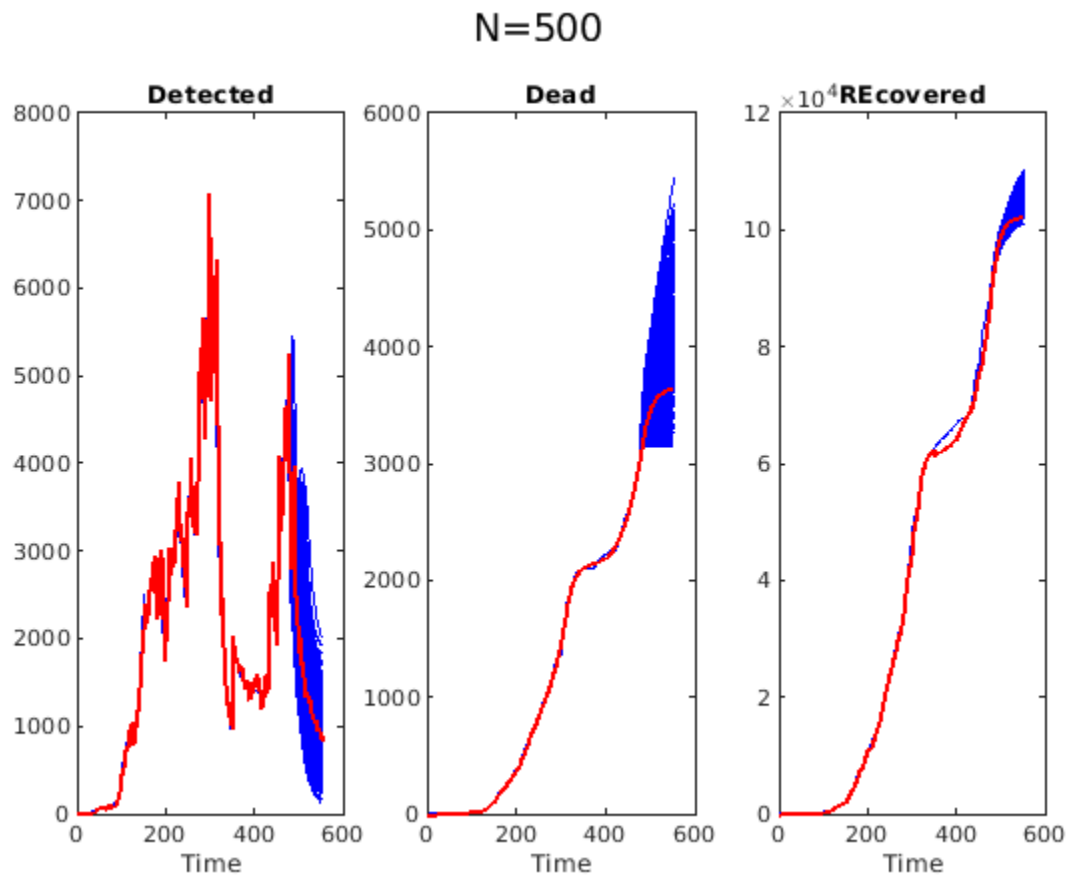








## 14.4. Uncertainty analysis



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## Chapter 15. Extension number15

### 15.1. Basic information

The extension to be validated consists of the time series from the data555 to the 596. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

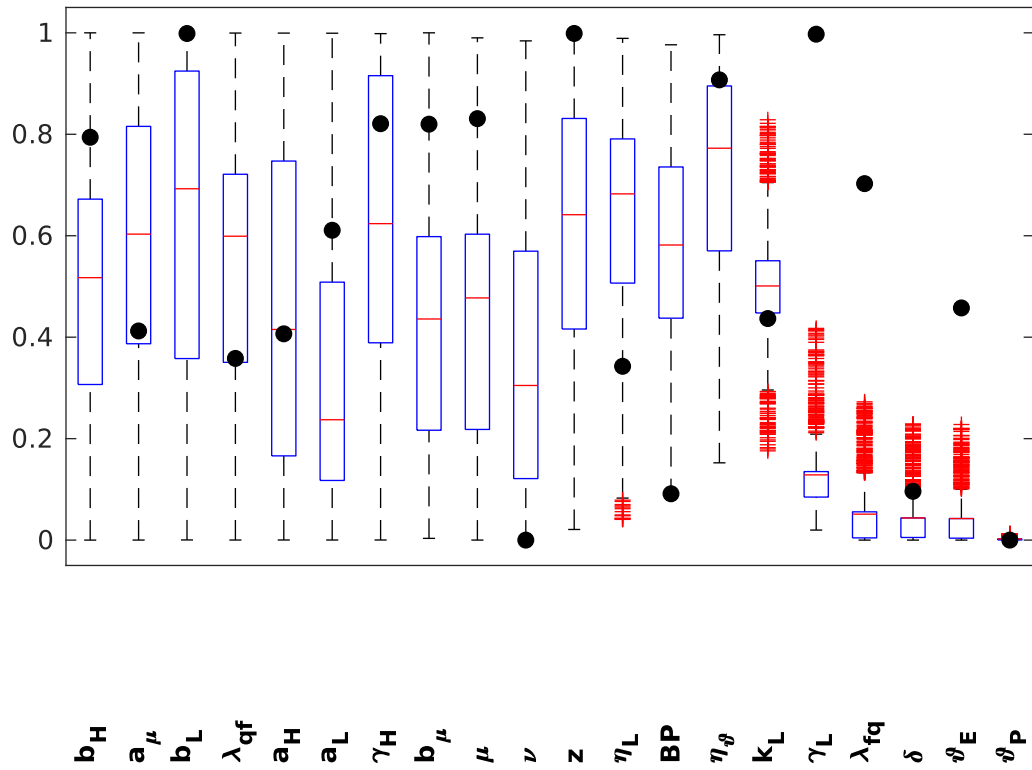
### 15.2. Estimated parameters with their intervals

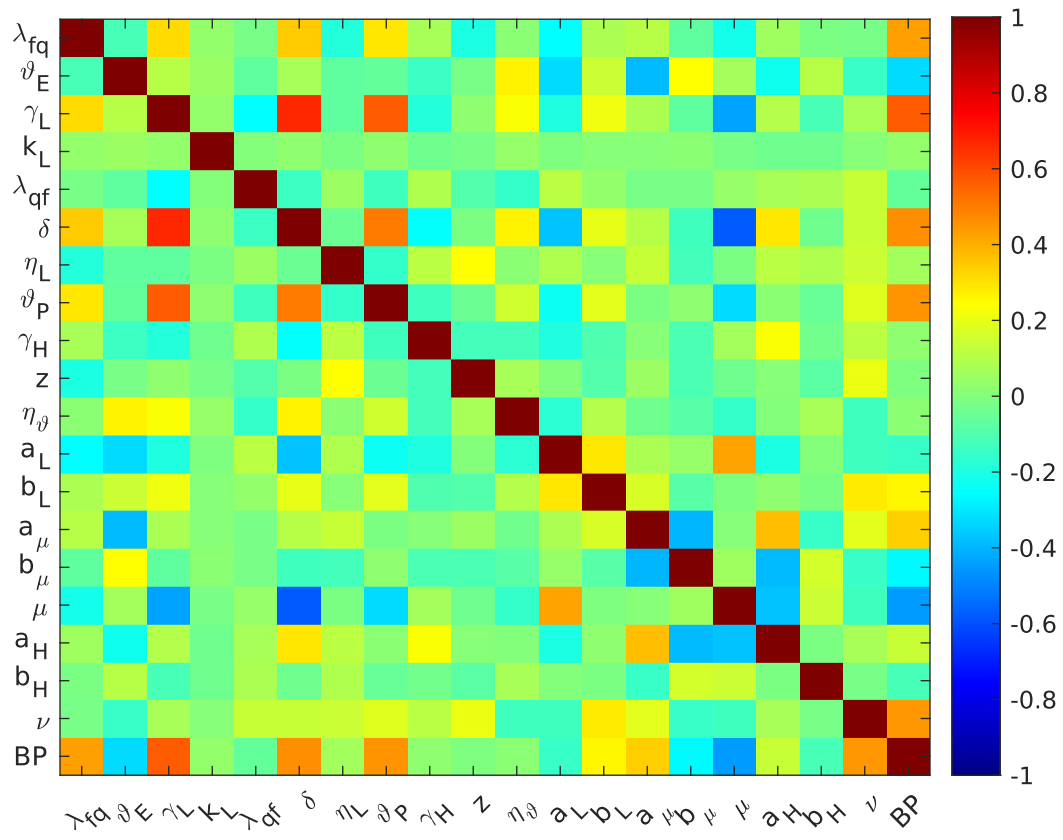
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

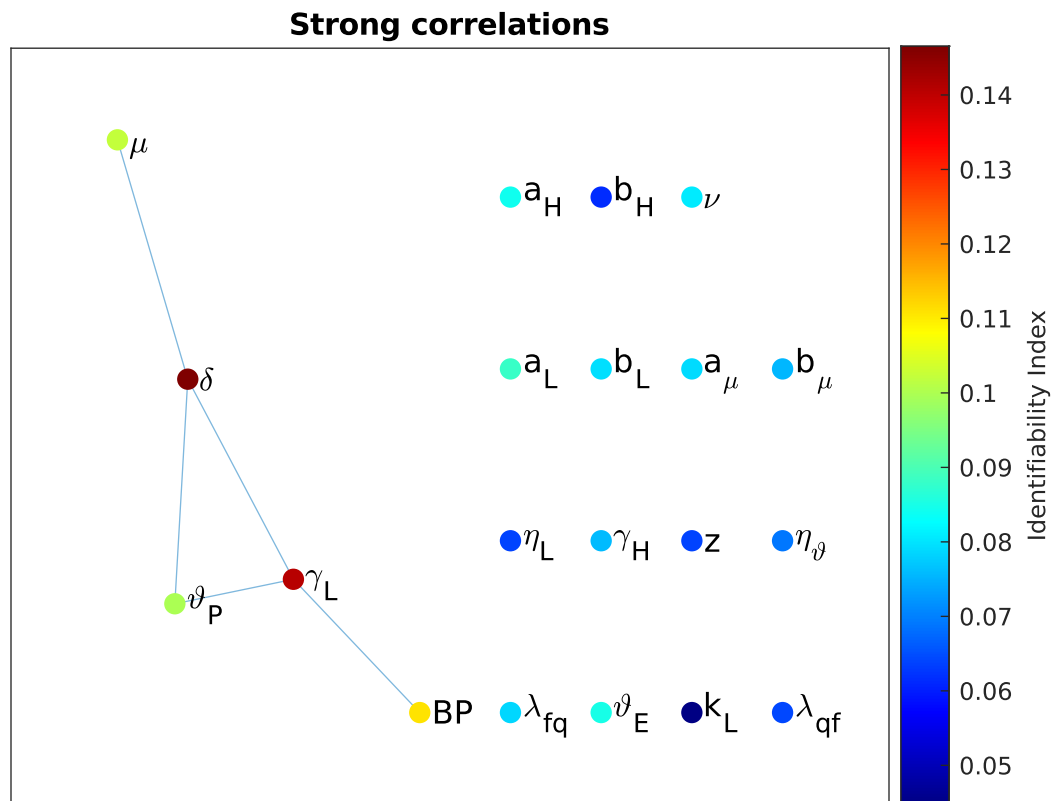
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.6724'	'0.7078'	'0.0512'	'0.7027'	'0.0788'
$\vartheta_E$	'0.4347'	'0.4871'	'0.0425'	'0.4577'	'0.0852'
$\gamma_L$	'0.722'	'1'	'0.1286'	'0.9973'	'0.1409'
$k_L$	'1'	'10'	'5.5092'	'4.9306'	'0.0448'
$\lambda_{qf}$	'0.3539'	'0.3642'	'0.5991'	'0.3582'	'0.0644'
$\delta$	'0.0014'	'0.0312'	'0.0065'	'0.0144'	'0.1465'
$\eta_L$	'0.3333'	'0.3442'	'0.6825'	'0.3426'	'0.0642'
$\vartheta_P$	'0'	'0'	'0.0023'	'0'	'0.0997'
$\gamma_H$	'0.02'	'1'	'0.6238'	'0.8209'	'0.076'
$z$	'28.6434'	'30'	'19.2433'	'29.9625'	'0.0639'
$\eta_{\vartheta}$	'0.2462'	'1'	'0.7725'	'0.9073'	'0.0691'
$a_L$	'9.3963'	'10.5185'	'4.3214'	'9.5509'	'0.0882'
$b_L$	'13.0277'	'15'	'10.6962'	'14.9811'	'0.0795'
$a_{\mu}$	'1'	'15'	'9.4443'	'6.7719'	'0.079'
$b_{\mu}$	'1'	'15'	'7.1026'	'12.4791'	'0.0757'
$\mu$	'0.02'	'1'	'0.4774'	'0.8308'	'0.1022'
$a_H$	'1'	'13.9024'	'6.8131'	'6.6928'	'0.0845'
$b_H$	'1'	'15'	'8.2428'	'12.1179'	'0.0615'
$\nu$	'0'	'0.001'	'152.4114'	'0.0005'	'0.0807'
BP	'491.4123'	'493.8609'	'542.5'	'491.5'	'0.1109'

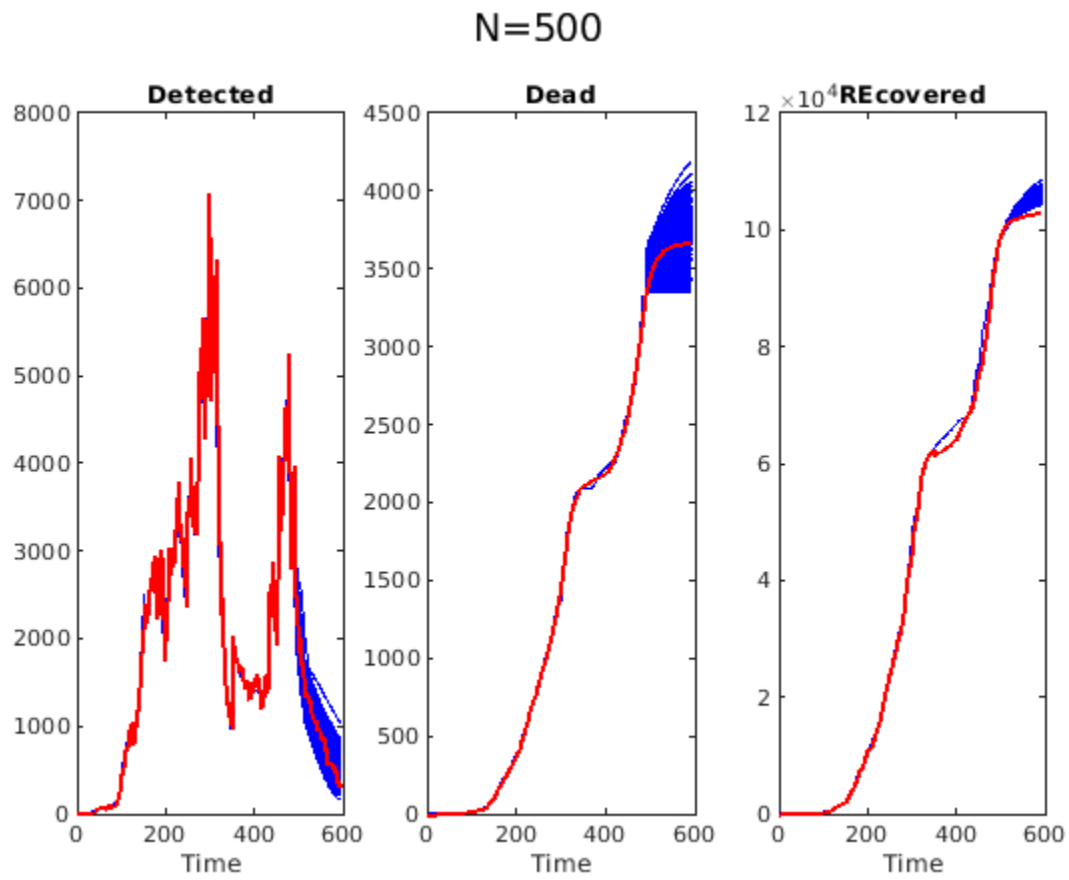
### 15.3. Identifiability analysis







## 15.4. Uncertainty analysis



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## Chapter 16. Extension number16

### 16.1. Basic information

The extension to be validated consists of the time series from the data596 to the 717. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

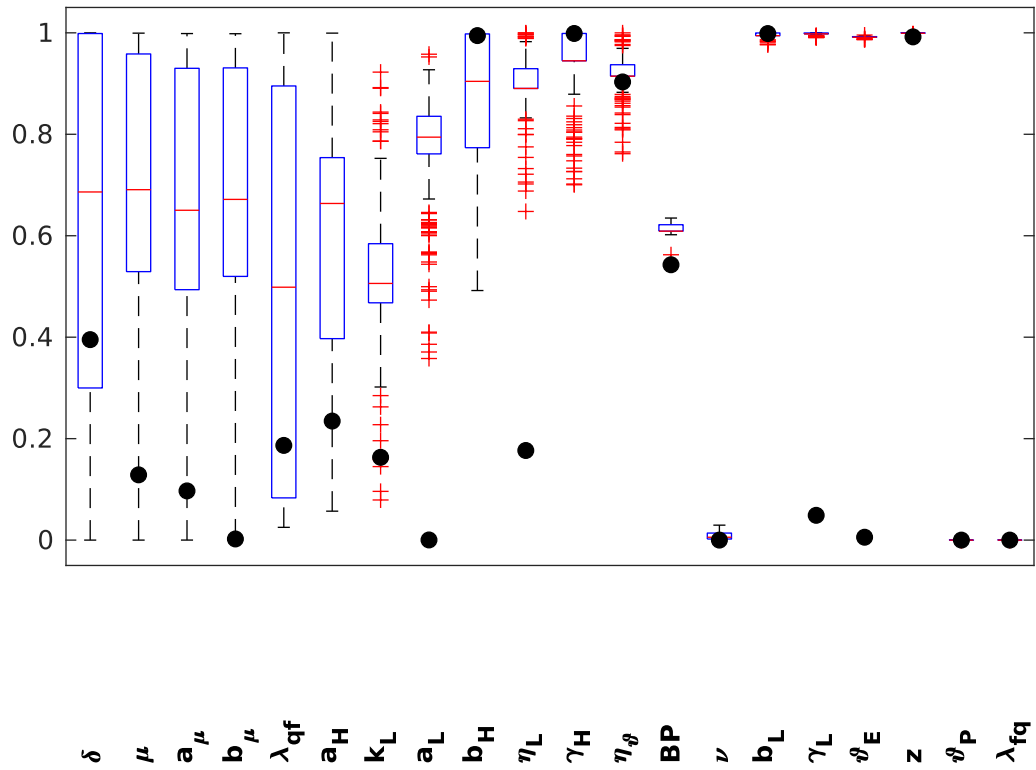
### 16.2. Estimated parameters with their intervals

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

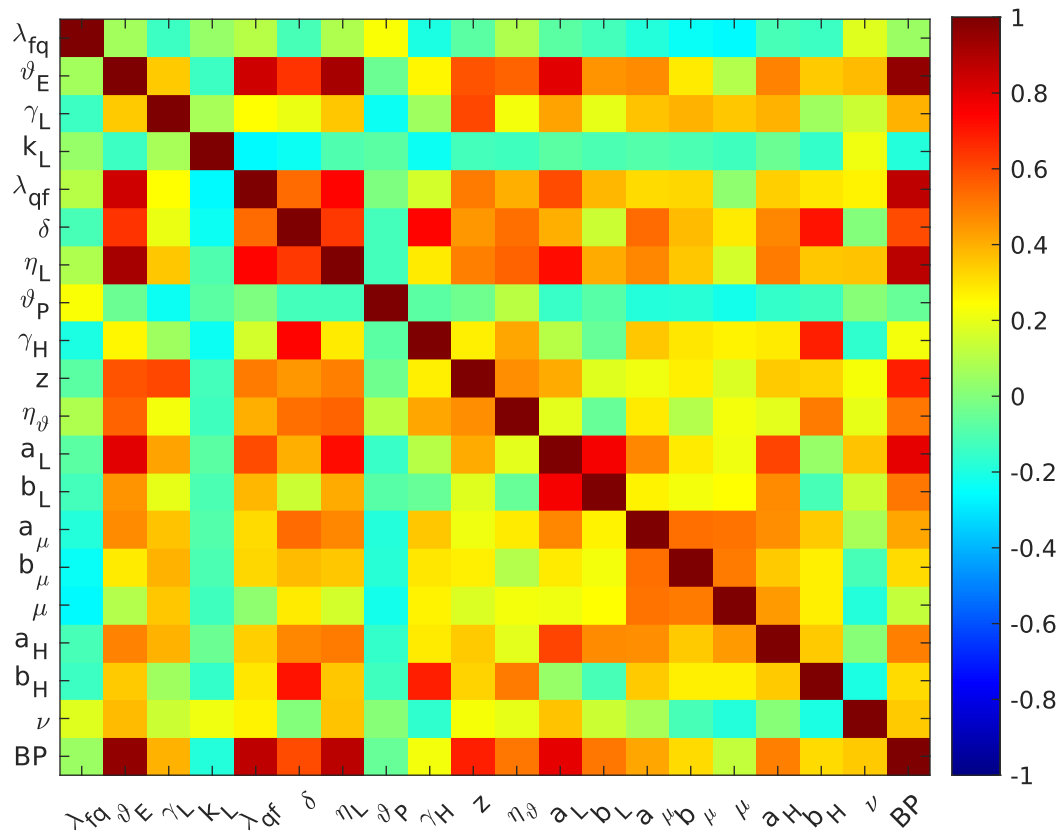
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

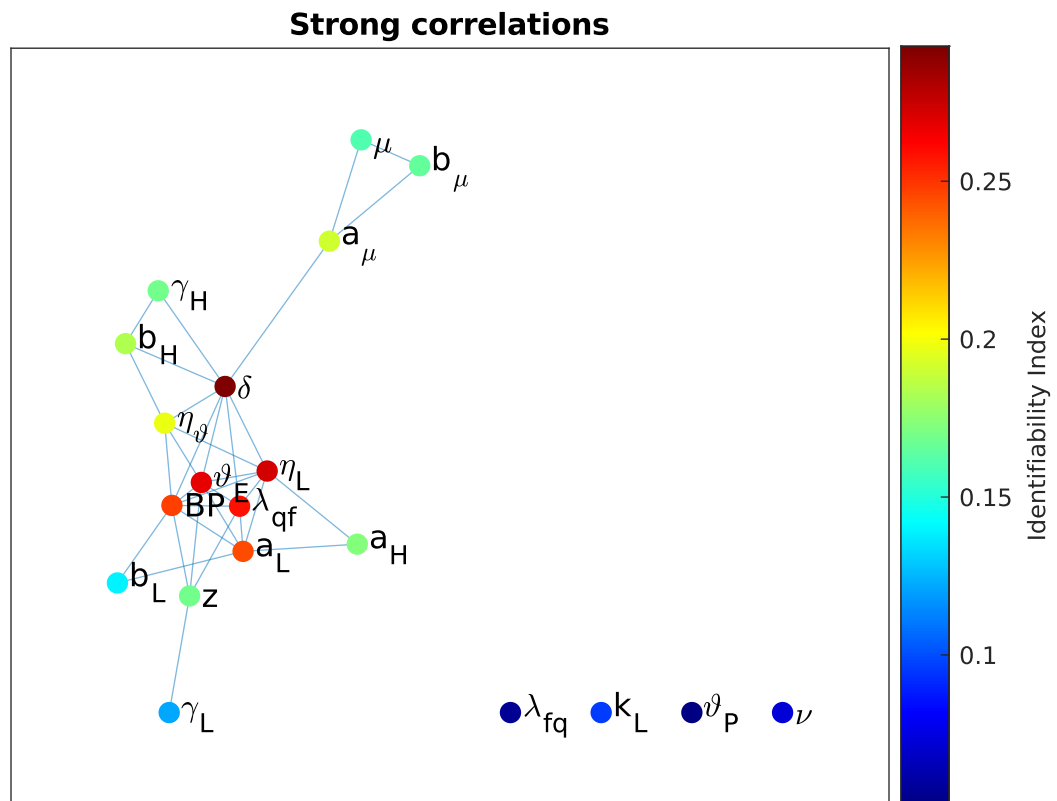
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0'	'0'	'0'	'0.0567'
$\vartheta_E$	'0.0052'	'0.0105'	'0.9913'	'0.0057'	'0.2676'
$\gamma_L$	'0.0081'	'0.1099'	'0.9979'	'0.0488'	'0.1219'
$k_L$	'1'	'10'	'5.5537'	'2.4687'	'0.0967'
$\lambda_{qf}$	'0.1663'	'0.6973'	'0.4985'	'0.1867'	'0.259'
$\delta$	'0.0311'	'0.0605'	'0.1029'	'0.0593'	'0.2927'
$\eta_L$	'0.1678'	'1'	'0.8903'	'0.1766'	'0.2722'
$\vartheta_P$	'0'	'0'	'0'	'0'	'0.0527'
$\gamma_H$	'0.3548'	'1'	'0.9448'	'0.9987'	'0.1693'
$z$	'22.4475'	'30'	'29.9777'	'29.7605'	'0.169'
$\eta_{\vartheta}$	'0.4907'	'1'	'0.9146'	'0.9032'	'0.1974'
$a_L$	'1'	'13.6'	'12.1207'	'1.0039'	'0.2447'
$b_L$	'1'	'15'	'14.9218'	'14.9799'	'0.1394'
$a_{\mu}$	'2.3553'	'7.0927'	'10.103'	'2.3577'	'0.1912'
$b_{\mu}$	'1'	'6.8871'	'10.4029'	'1.0314'	'0.1655'
$\mu$	'0.0145'	'0.2784'	'0.6908'	'0.1286'	'0.1612'
$a_H$	'2.2922'	'4.2944'	'10.2906'	'4.2851'	'0.173'
$b_H$	'6.7831'	'15'	'13.6609'	'14.9236'	'0.1837'
$\nu$	'0'	'0.0003'	'2.8192'	'0.0001'	'0.073'
BP	'637.4752'	'640.4192'	'647.5741'	'637.5054'	'0.2471'

### 16.3. Identifiability analysis









## 16.4. Uncertainty analysis

N=500

