

# **Validation process forHUILA**

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

The number of estimations needed to perform the validation was1000.

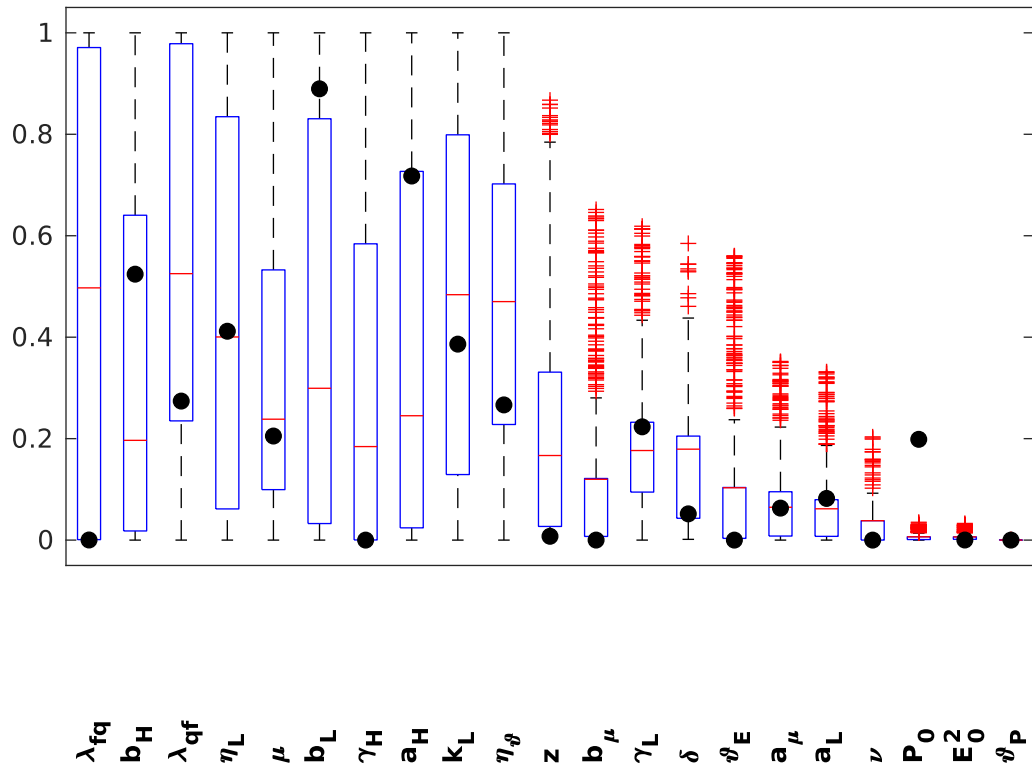
### 1.2. Estimated parameters with their intervals

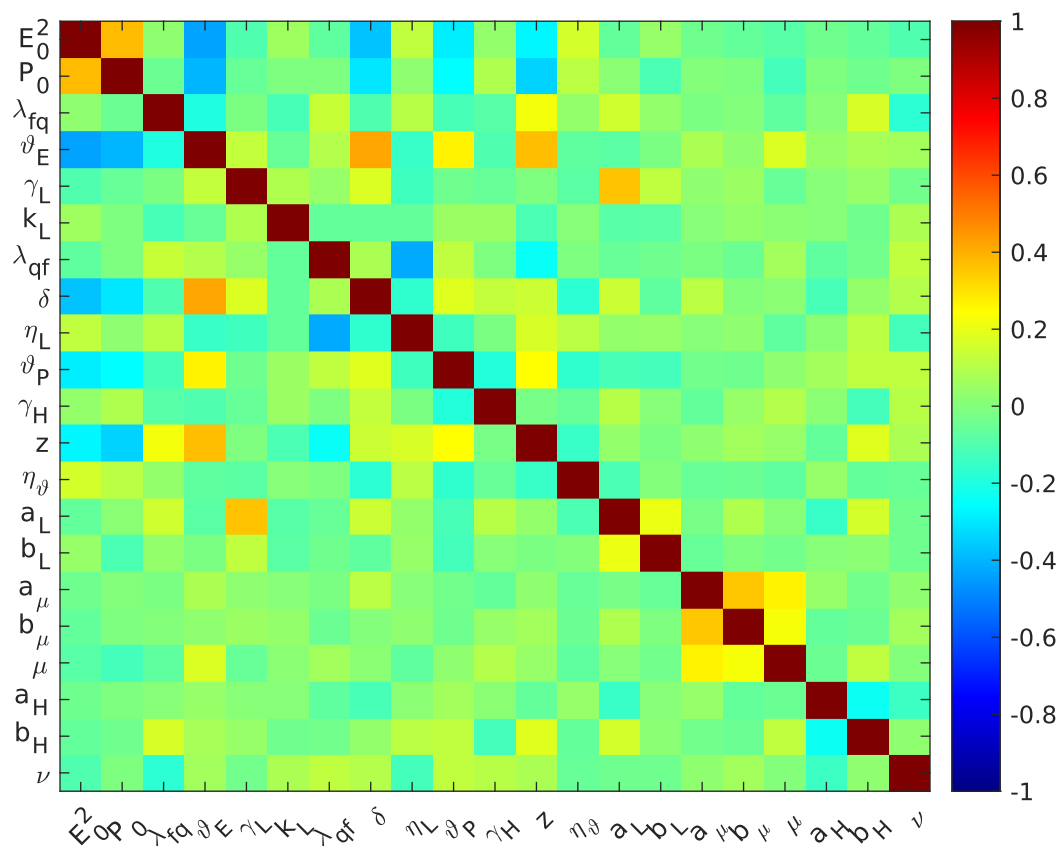
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

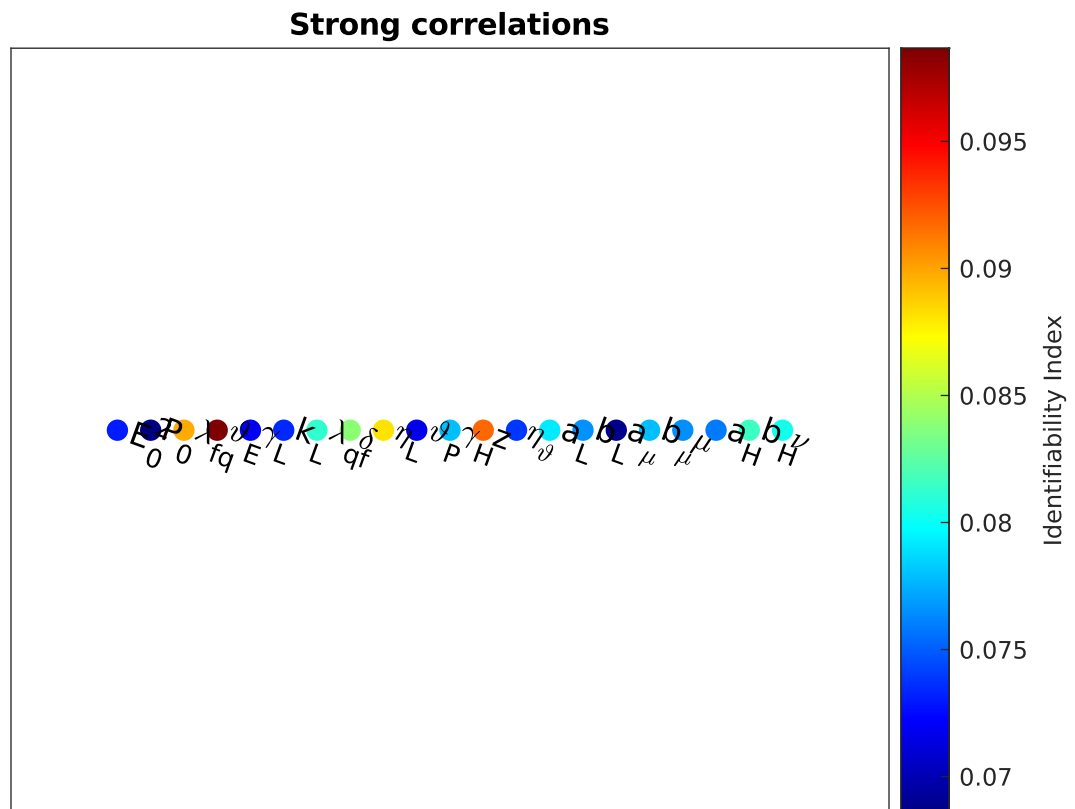
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
E^2_0	'0'	'0.4604'	'12.7008'	'0.3119'	'0.0731'
P_0	'66.3711'	'82.831'	'2.6142'	'79.4654'	'0.0686'
\lambda_{fq}	'0.0001'	'0.0007'	'0.4972'	'0.0002'	'0.0898'
\vartheta_E	'0'	'0'	'0.1037'	'0'	'0.0987'
\gamma_L	'0.2124'	'0.225'	'0.1767'	'0.2233'	'0.0719'
k_L	'1.7479'	'8.3497'	'5.354'	'4.4769'	'0.0735'
\lambda_{qf}	'0.2455'	'0.5288'	'0.5252'	'0.2741'	'0.0812'
\delta	'0.0074'	'0.0095'	'0.0269'	'0.0078'	'0.084'
\eta_L	'0.4113'	'0.4783'	'0.4004'	'0.4117'	'0.0881'
\vartheta_P	'0'	'0'	'0.0001'	'0'	'0.0719'
\gamma_H	'0'	'0'	'0.1844'	'0'	'0.0779'
z	'0.2156'	'0.2259'	'5.0037'	'0.2259'	'0.0918'
\eta_{\vartheta}	'0.2648'	'0.2913'	'0.4701'	'0.2665'	'0.074'
a_L	'1.8547'	'2.3379'	'1.8666'	'2.1497'	'0.0792'
b_L	'11.6537'	'13.4718'	'5.1902'	'13.4547'	'0.0766'
a_{\mu}	'1.5571'	'5.7257'	'1.9122'	'1.8827'	'0.0689'
b_{\mu}	'1'	'2.5319'	'2.6858'	'1.0007'	'0.0779'
\mu	'0.0809'	'0.3236'	'0.2383'	'0.2051'	'0.0765'
a_H	'1.6913'	'15'	'4.4322'	'11.0479'	'0.0759'
b_H	'1.5151'	'10.4658'	'3.753'	'8.3391'	'0.0816'
\nu	'0.0001'	'0.0005'	'19.1209'	'0.0003'	'0.0804'

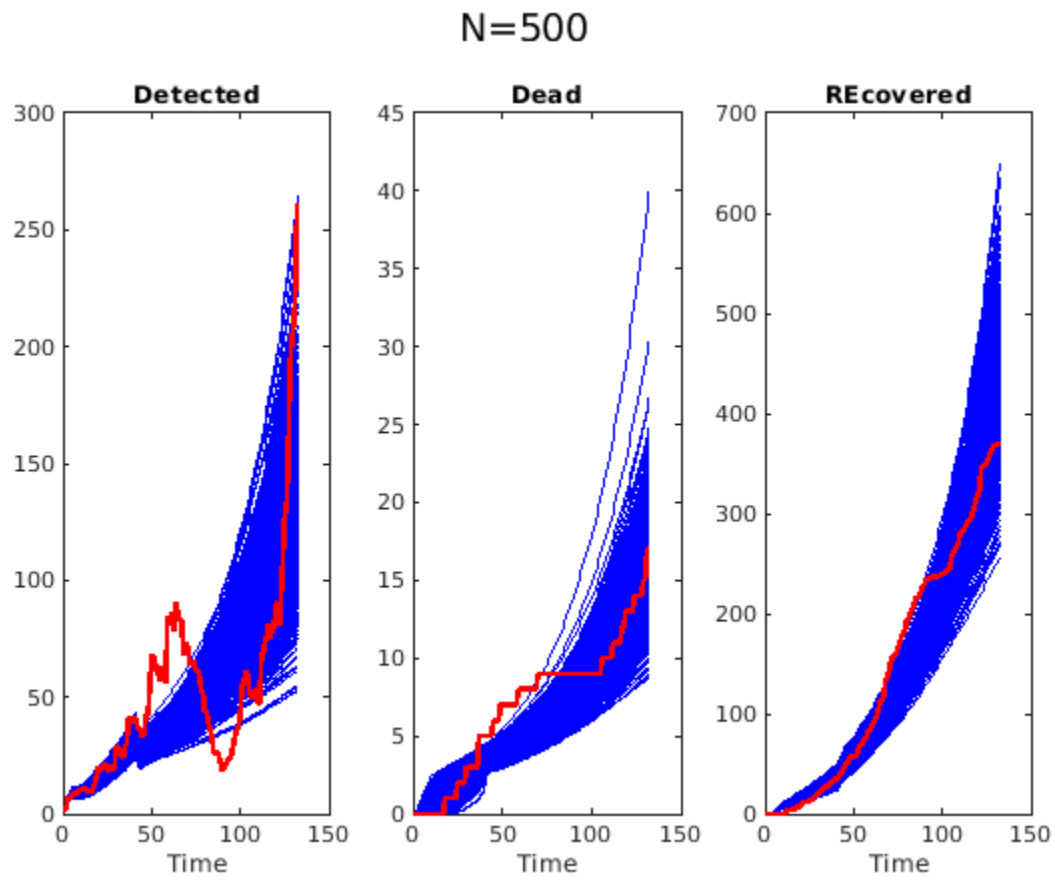
### 1.3. Identifiability analysis







## 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 data133 to the 177. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

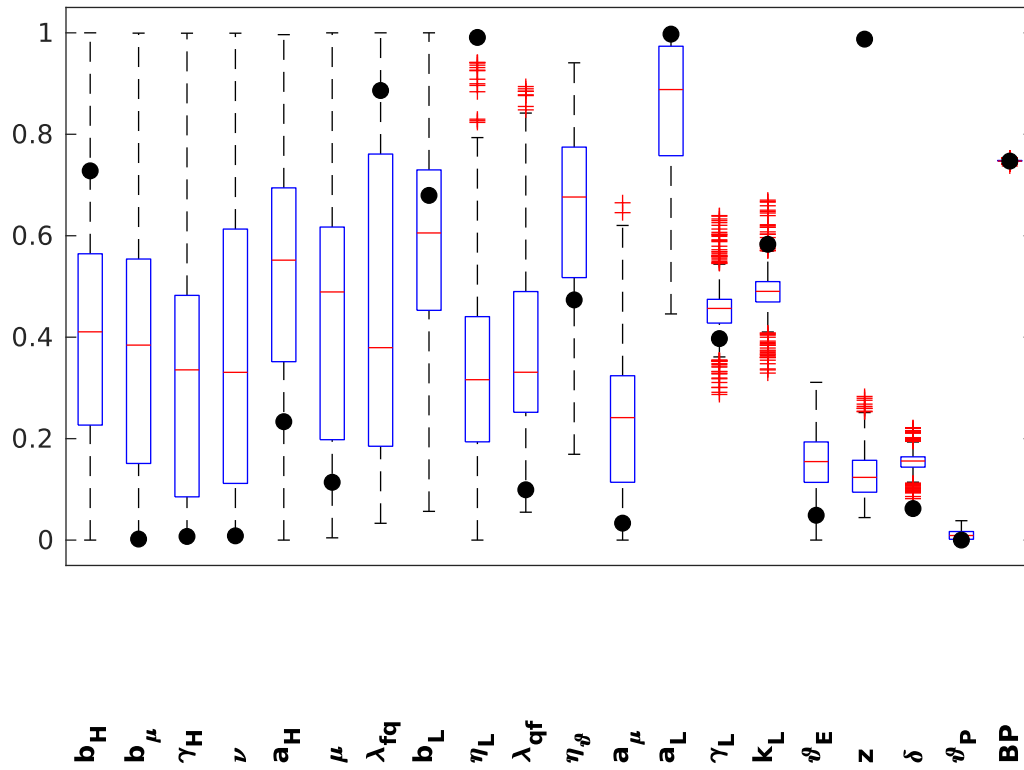
### 2.2. Estimated parameters with their intervals

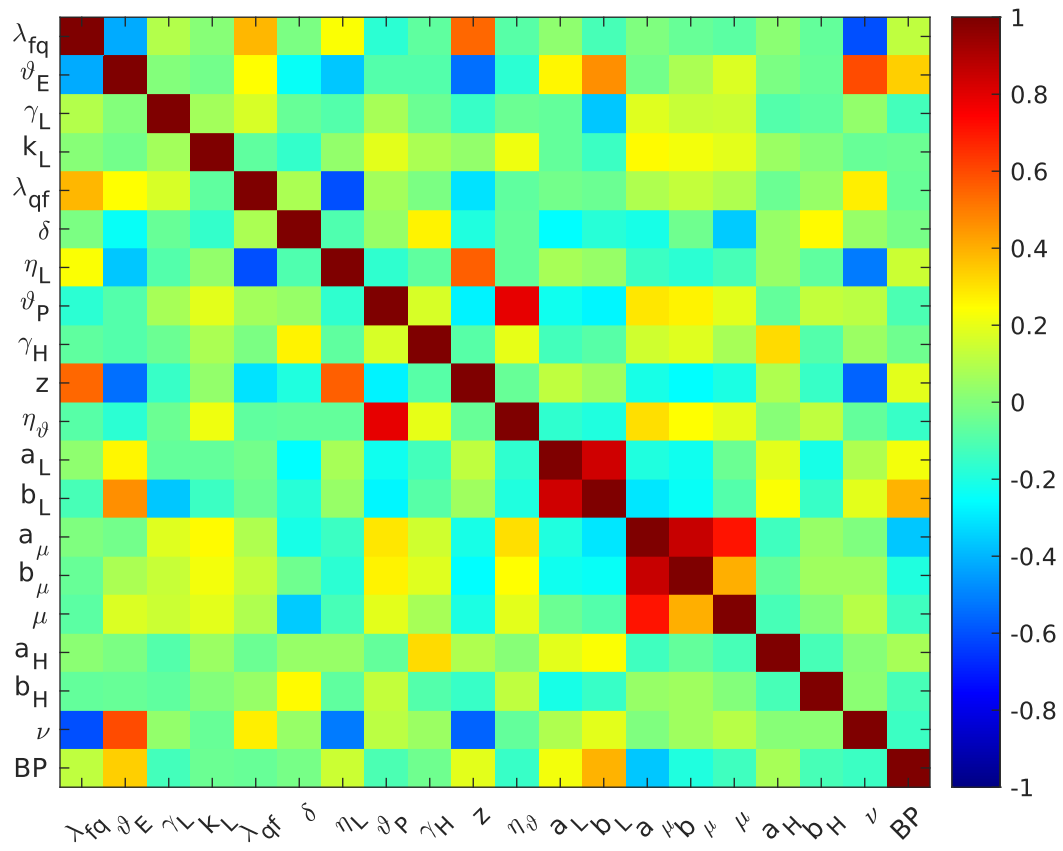
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

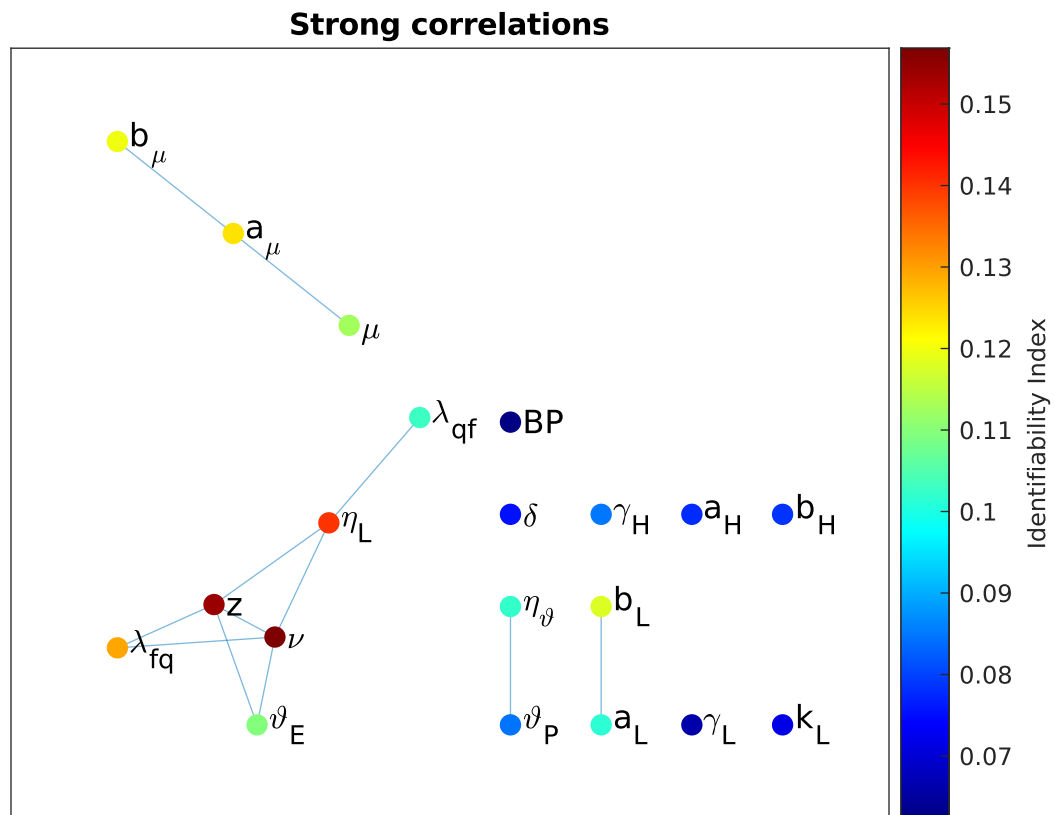
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.801'	'0.915'	'0.3794'	'0.8863'	'0.1294'
$\vartheta_E$	'0.0455'	'0.1013'	'0.1548'	'0.049'	'0.1098'
$\gamma_L$	'0.2479'	'0.8365'	'0.4567'	'0.3972'	'0.0663'
$k_L$	'1'	'8.776'	'5.4131'	'6.2484'	'0.072'
$\lambda_{qf}$	'0.0927'	'0.1049'	'0.3312'	'0.0992'	'0.1032'
$\delta$	'0.0075'	'0.0105'	'0.0234'	'0.0093'	'0.0754'
$\eta_L$	'0.8335'	'0.9913'	'0.3163'	'0.9909'	'0.14'
$\vartheta_P$	'0.0001'	'0.0002'	'0.0091'	'0.0001'	'0.0849'
$\gamma_H$	'0'	'0.0154'	'0.3356'	'0.0072'	'0.0852'
$z$	'26.0849'	'29.8434'	'3.7143'	'29.6267'	'0.1539'
$\eta_{\vartheta}$	'0.4542'	'0.4944'	'0.676'	'0.4735'	'0.1025'
$a_L$	'11.1539'	'15'	'13.4341'	'14.9644'	'0.1016'
$b_L$	'6.4484'	'10.9848'	'9.4768'	'10.5132'	'0.118'
$a_{\mu}$	'1.1984'	'2.2149'	'4.3803'	'1.4679'	'0.1238'
$b_{\mu}$	'1.0215'	'2.0768'	'6.3816'	'1.0287'	'0.1198'
$\mu$	'0.1064'	'0.2455'	'0.4892'	'0.114'	'0.1129'
$a_H$	'1'	'15'	'8.726'	'4.2682'	'0.078'
$b_H$	'1.2688'	'14.44'	'6.7478'	'11.191'	'0.0787'
$\nu$	'3.5716'	'6.4625'	'165.3535'	'4.197'	'0.1569'
BP	'132.4008'	'137.05'	'132.5'	'132.5'	'0.0624'

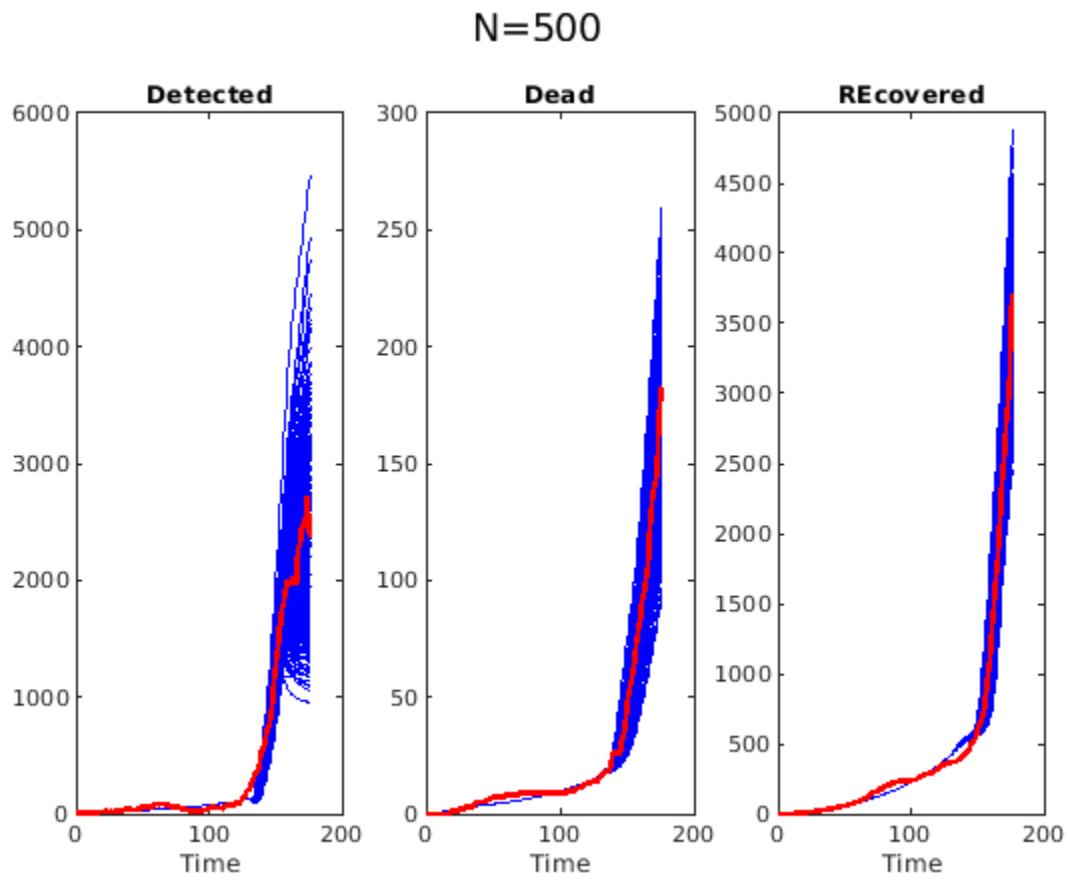
## 2.3. Identifiability analysis







## 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 data177 to the 204. The status of the validation is: COMPLETED.

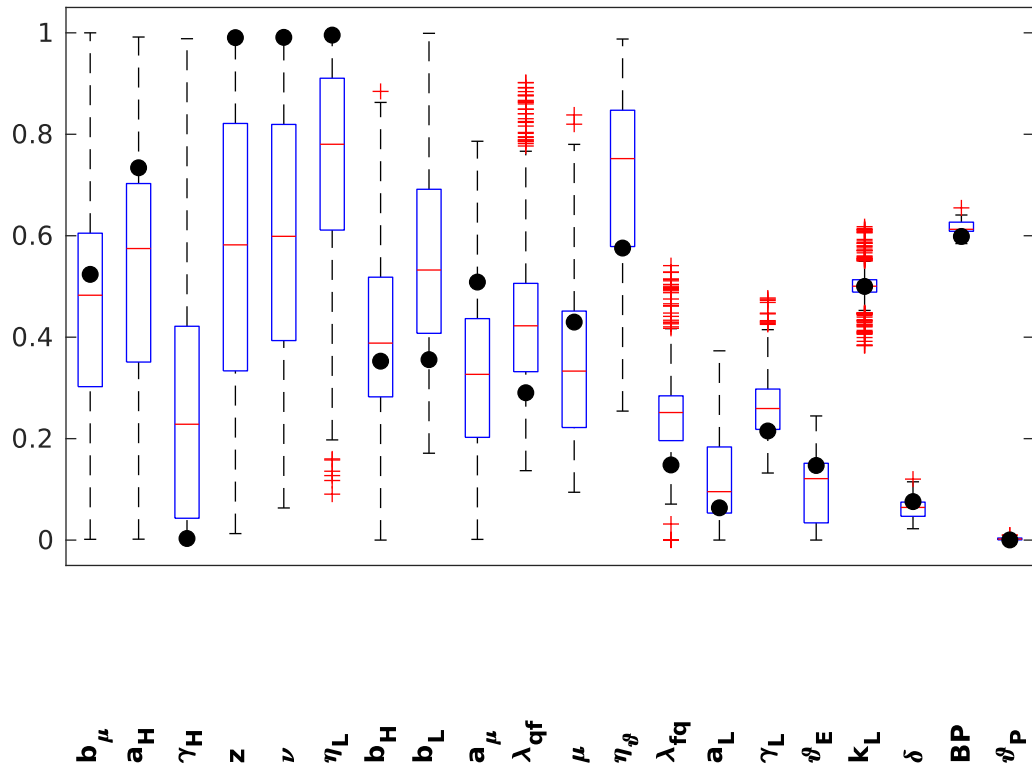
The number of estimations needed to perform the validation was1000.

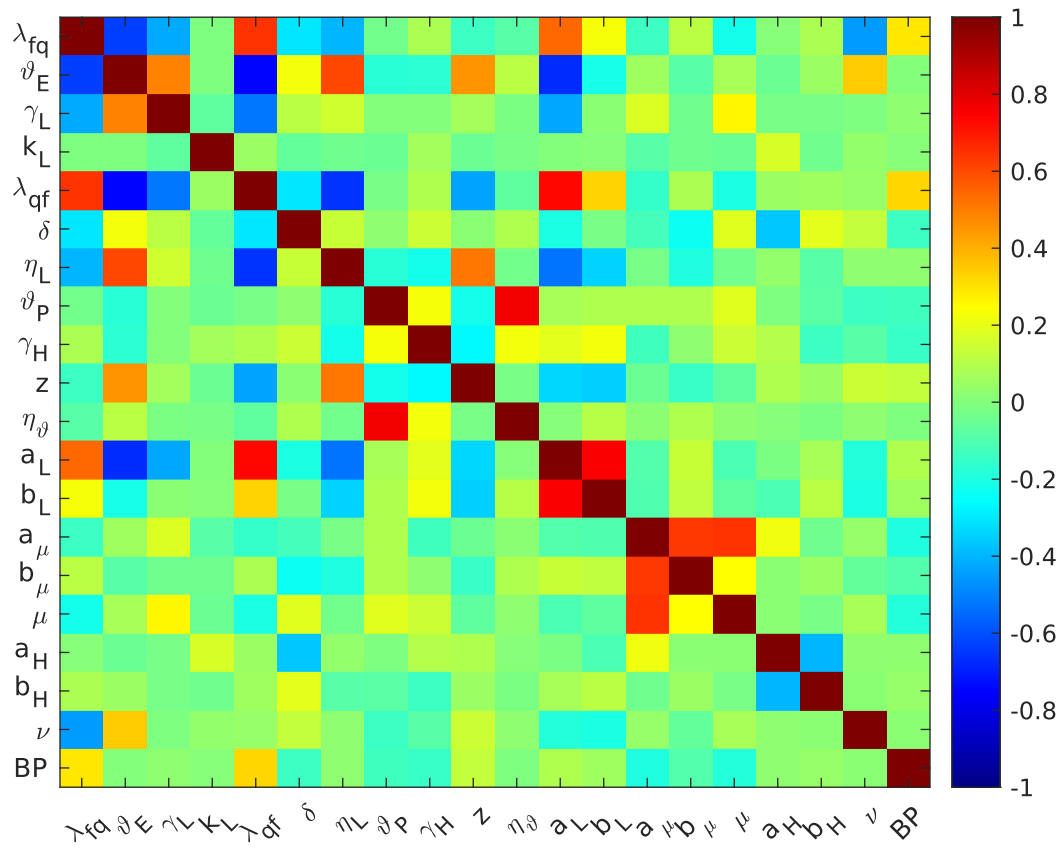
### 3.2. Estimated parameters with their intervals

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

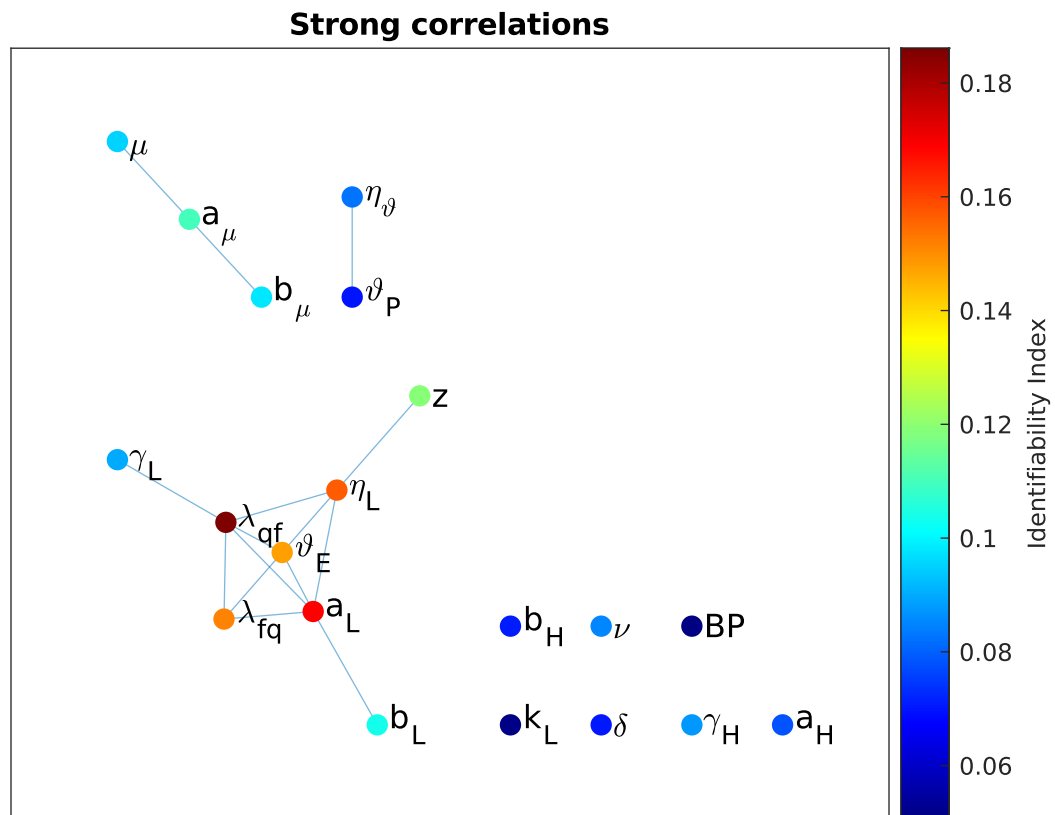
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.2226'	'0.2803'	'0.2515'	'0.1482'	'0.1512'
$\vartheta_E$	'0.1128'	'0.1295'	'0.1212'	'0.1471'	'0.148'
$\gamma_L$	'0.2422'	'0.2766'	'0.2594'	'0.2151'	'0.0902'
$k_L$	'5.3601'	'5.6492'	'5.5046'	'5.5005'	'0.0514'
$\lambda_{qf}$	'0.3926'	'0.4523'	'0.4225'	'0.2905'	'0.1861'
$\delta$	'0.0084'	'0.0109'	'0.0097'	'0.0114'	'0.0704'
$\eta_L$	'0.751'	'0.8097'	'0.7803'	'0.9955'	'0.1567'
$\vartheta_P$	'0.0018'	'0.0025'	'0.0021'	'0.0003'	'0.0699'
$\gamma_H$	'0.1994'	'0.2574'	'0.2284'	'0.0032'	'0.0873'
$z$	'16.3151'	'18.6054'	'17.4602'	'29.7146'	'0.1194'
$\eta_{\vartheta}$	'0.7281'	'0.776'	'0.752'	'0.5757'	'0.0828'
$a_L$	'2.1026'	'2.571'	'2.3368'	'1.8913'	'0.1687'
$b_L$	'8.1214'	'8.7862'	'8.4538'	'5.9804'	'0.1042'
$a_{\mu}$	'5.2546'	'5.8943'	'5.5744'	'8.121'	'0.11'
$b_{\mu}$	'7.3422'	'8.174'	'7.7581'	'8.3337'	'0.0982'
$\mu$	'0.31'	'0.3563'	'0.3332'	'0.4298'	'0.0954'
$a_H$	'8.5956'	'9.4976'	'9.0466'	'11.276'	'0.0787'
$b_H$	'6.0606'	'6.8122'	'6.4364'	'5.938'	'0.0714'
$\nu$	'282.0911'	'316.7325'	'299.4118'	'495.5252'	'0.0853'
BP	'176.3822'	'176.6178'	'176.5'	'175.5'	'0.0508'

### 3.3. Identifiability analysis

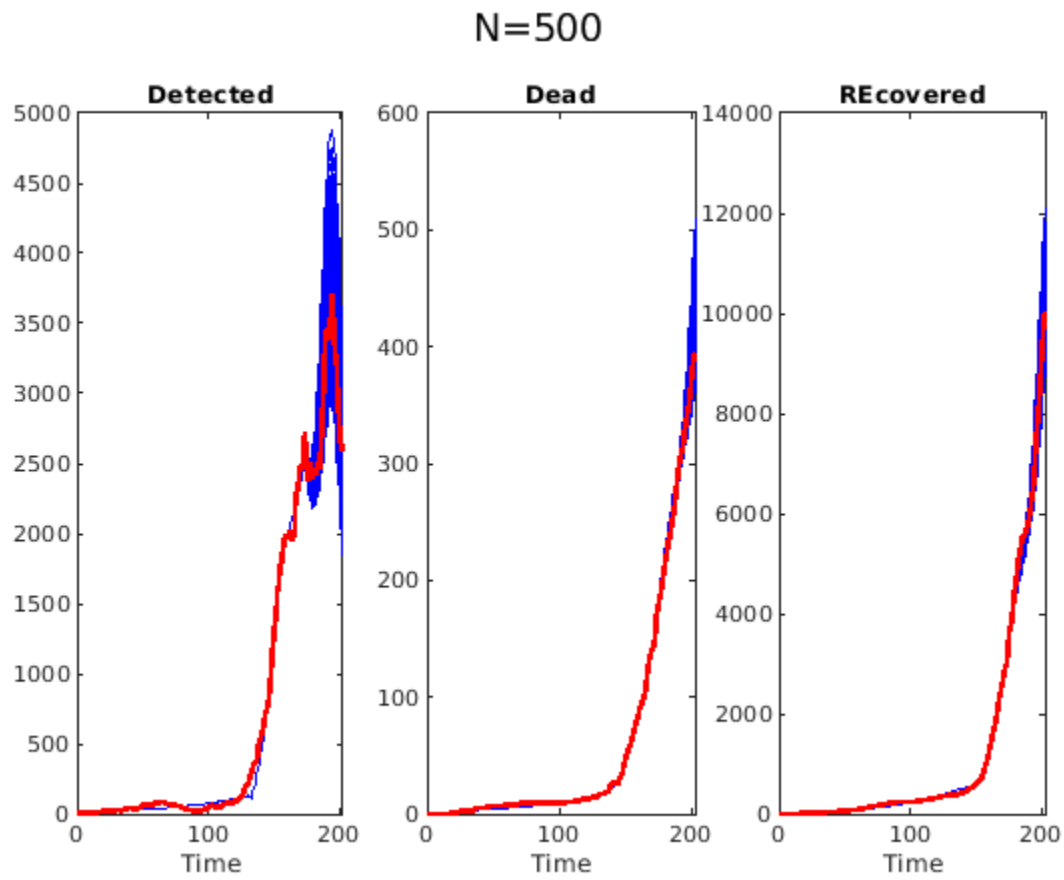








### 3.4. Uncertainty analysys



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## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data204 to the 235. The status of the validation is: COMPLETED.

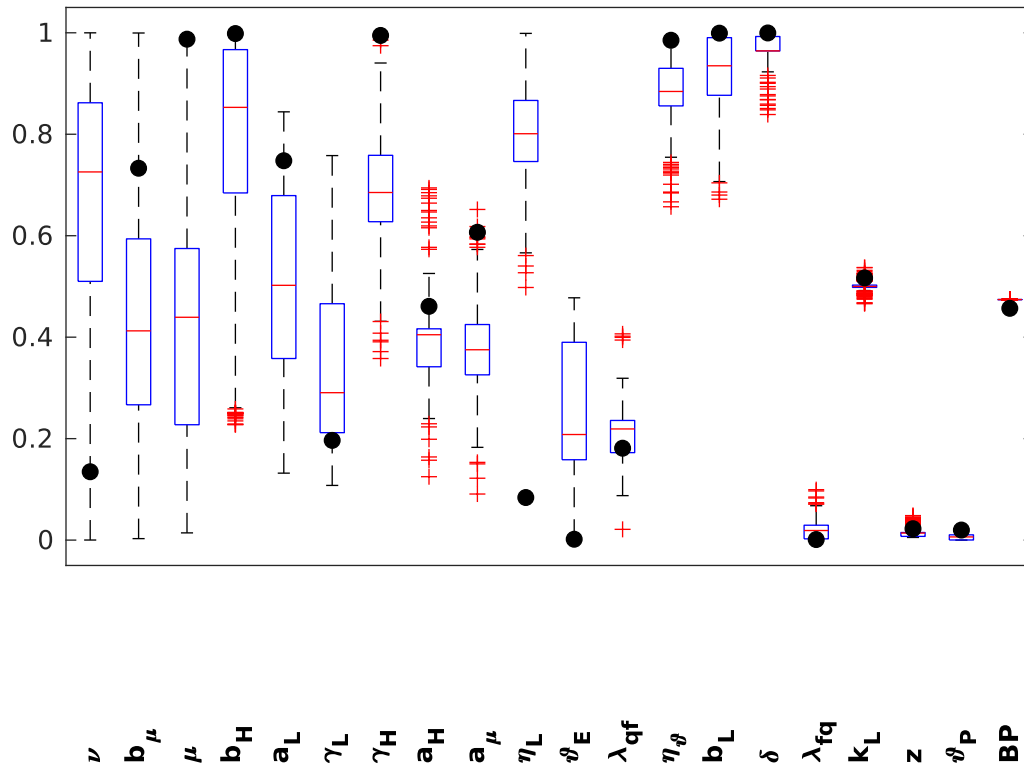
The number of estimations needed to perform the validation was1000.

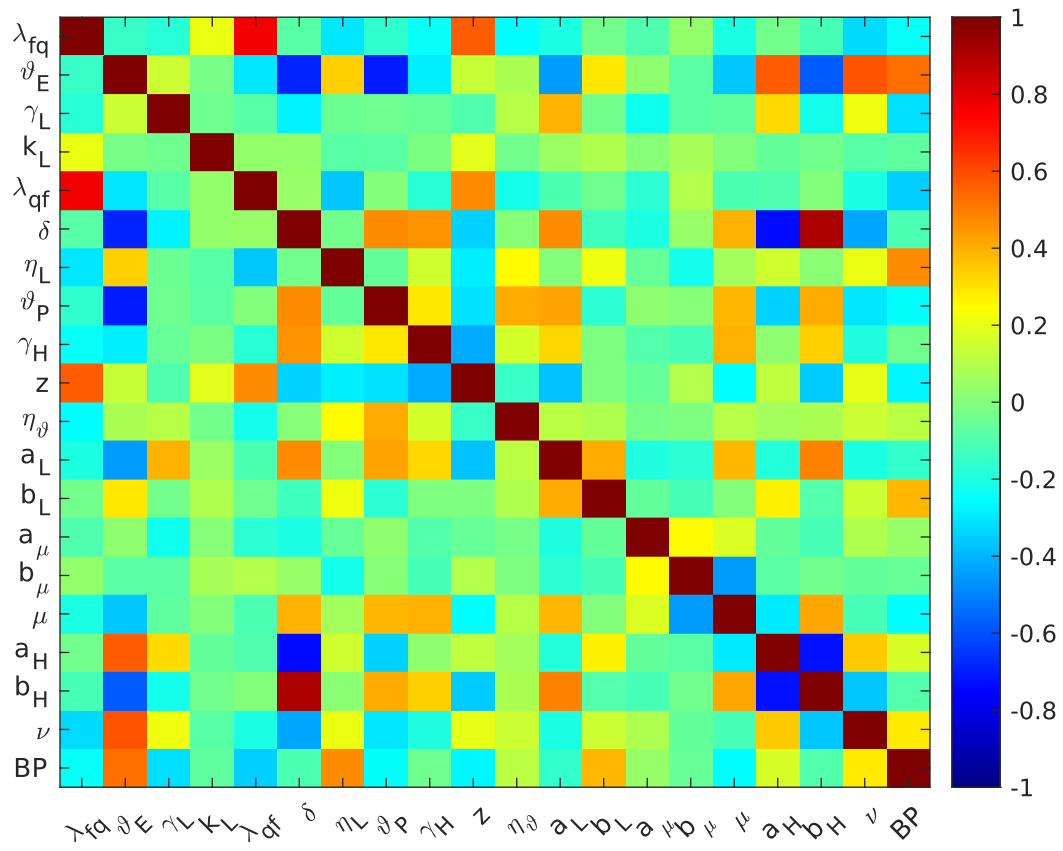
### 4.2. Estimated parameters with their intervals

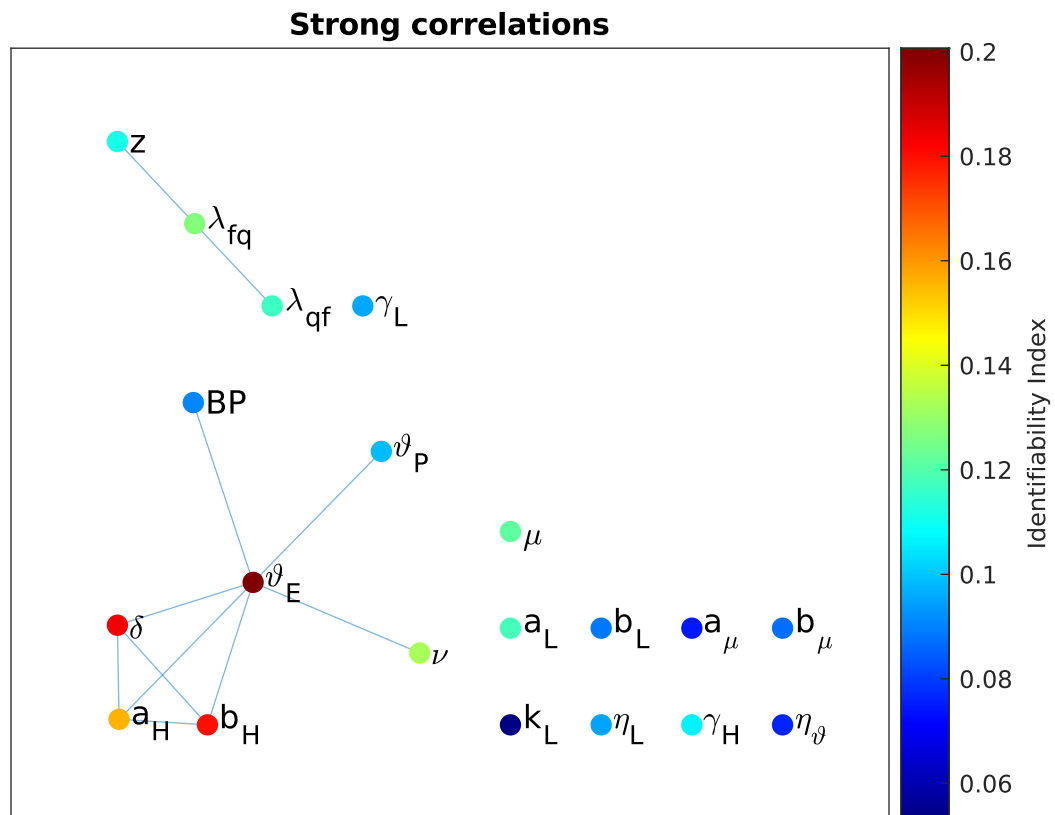
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0502'	'0.019'	'0.0011'	'0.1272'
$\vartheta_E$	'0.1863'	'0.2299'	'0.2081'	'0.0017'	'0.2007'
$\gamma_L$	'0.2574'	'0.3264'	'0.2919'	'0.1966'	'0.0957'
$k_L$	'5.3761'	'5.6239'	'5.5'	'5.6509'	'0.0533'
$\lambda_{qf}$	'0.185'	'0.2537'	'0.2193'	'0.1811'	'0.1171'
$\delta$	'0.1355'	'0.15'	'0.1446'	'0.1499'	'0.1838'
$\eta_L$	'0.7725'	'0.8294'	'0.8009'	'0.0839'	'0.0949'
$\vartheta_P$	'0.0054'	'0.0072'	'0.0063'	'0.0198'	'0.0987'
$\gamma_H$	'0.6504'	'0.7199'	'0.6851'	'0.9948'	'0.1067'
$z$	'0'	'0.9528'	'0.4218'	'0.6727'	'0.1118'
$\eta_{\vartheta}$	'0.8622'	'0.9054'	'0.8838'	'0.9853'	'0.0766'
$a_L$	'7.6165'	'8.4453'	'8.0309'	'11.469'	'0.1183'
$b_L$	'13.6476'	'14.5237'	'14.0856'	'14.9896'	'0.0885'
$a_{\mu}$	'5.8919'	'6.6139'	'6.2529'	'9.495'	'0.075'
$b_{\mu}$	'6.2506'	'7.2978'	'6.7742'	'11.2622'	'0.0878'
$\mu$	'0.3976'	'0.4809'	'0.4392'	'0.9874'	'0.1219'
$a_H$	'6.1712'	'7.1634'	'6.6673'	'7.4511'	'0.1558'
$b_H$	'12.2313'	'13.6365'	'12.9339'	'14.9786'	'0.1797'
$\nu$	'343.2822'	'382.4432'	'362.8627'	'67.3661'	'0.1323'
BP	'204.4062'	'204.5938'	'204.5'	'203.4999'	'0.0912'

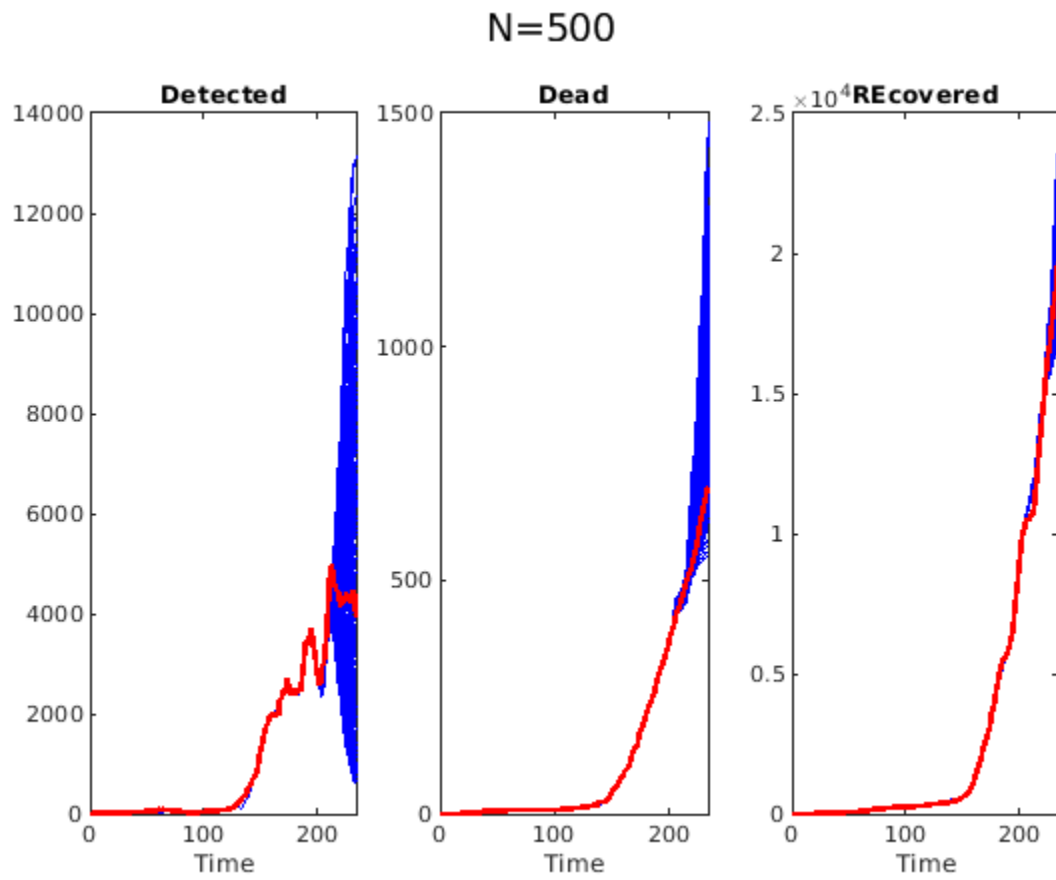
### 4.3. Identifiability analysis







#### 4.4. Uncertainty analysys



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## Chapter 5. Extension number5

### 5.1. Basic information

The extension to be validated consists of the time series from the data235 to the 270. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

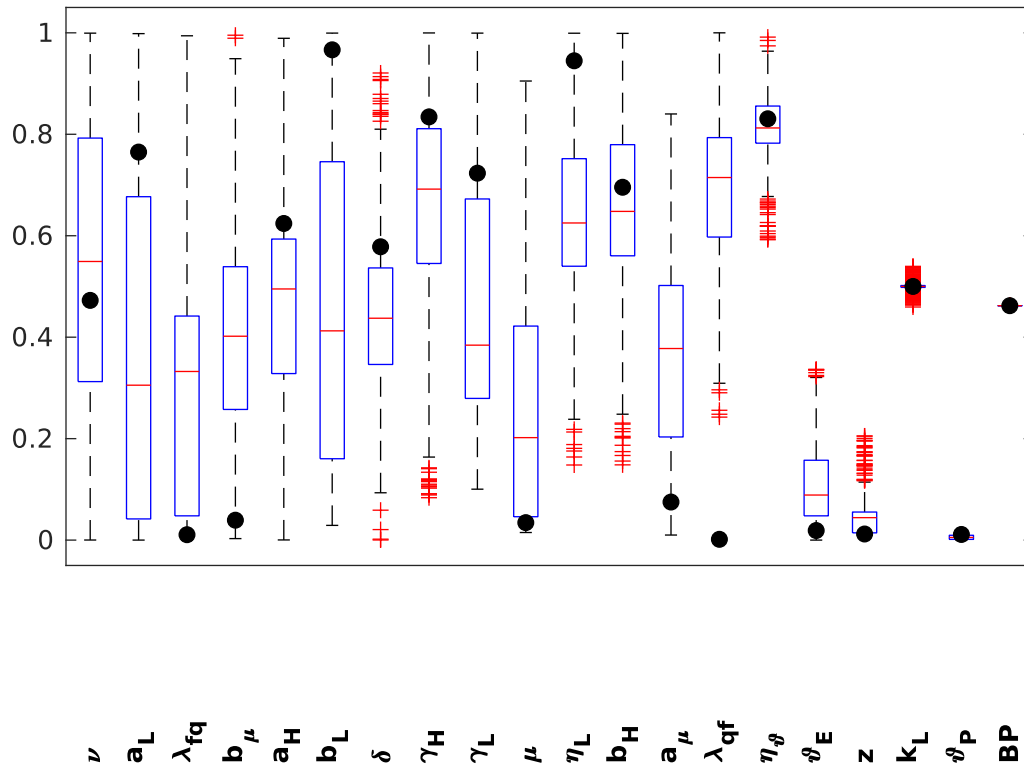
### 5.2. Estimated parameters with their intervals

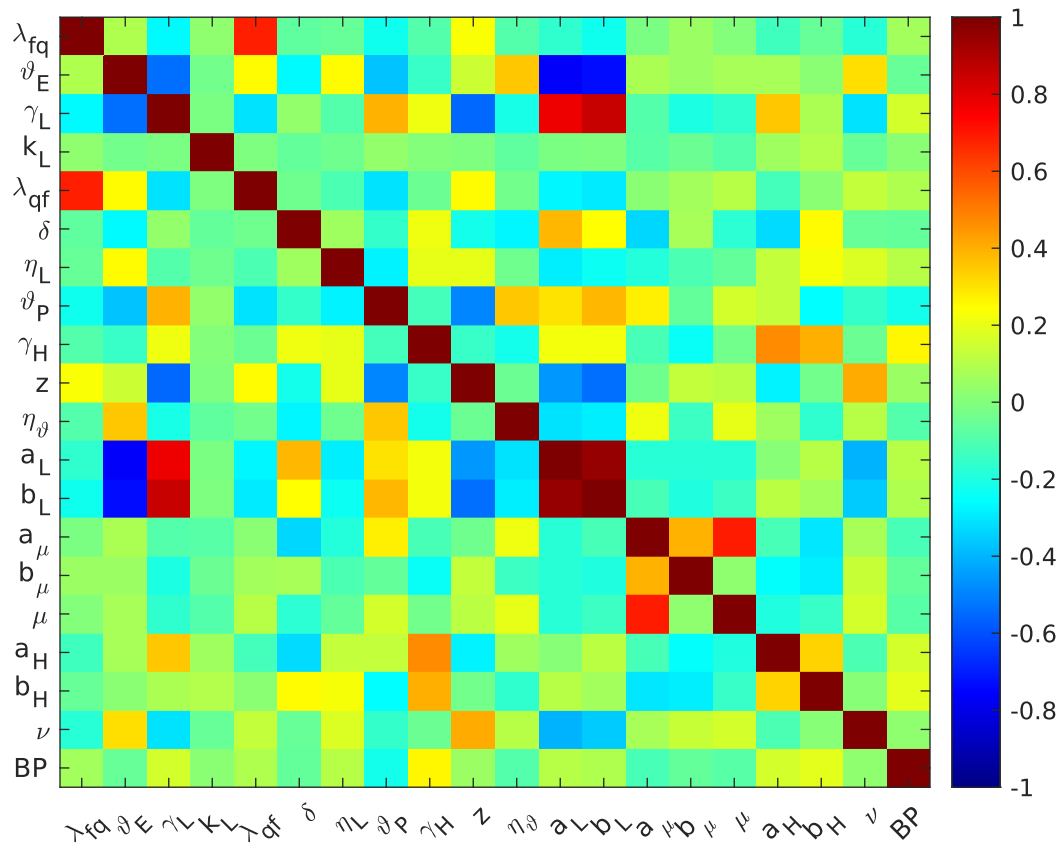
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

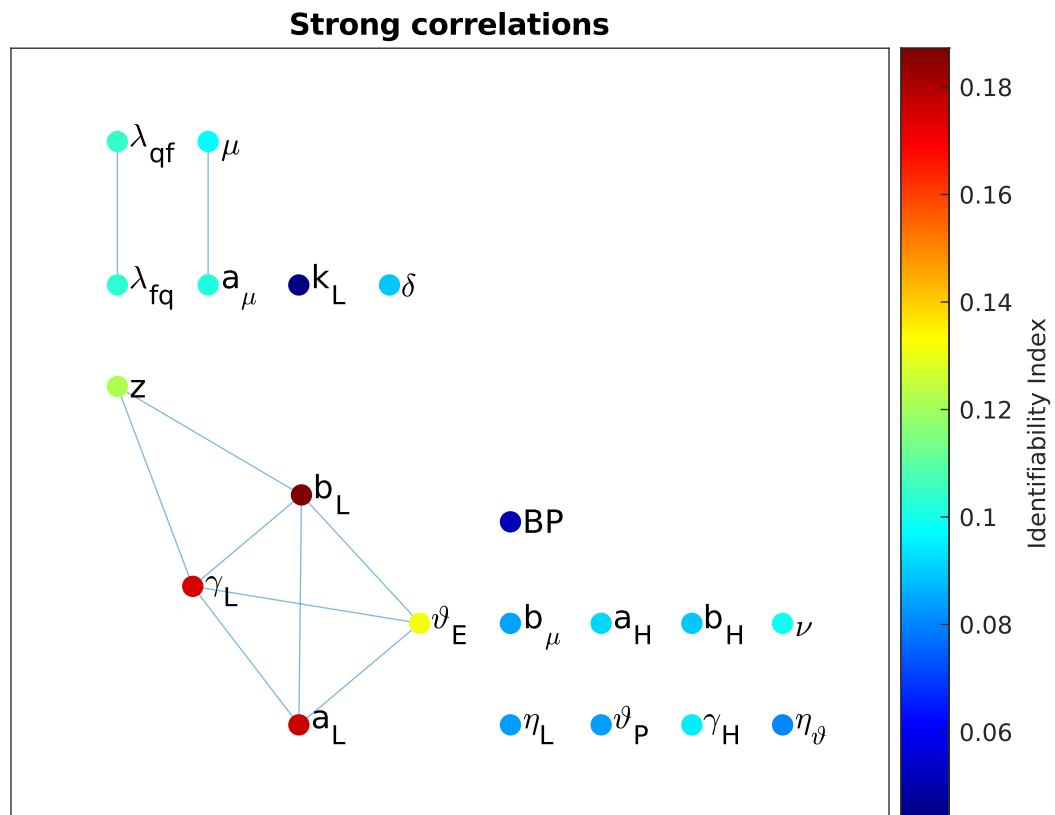
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3002'	'0.3646'	'0.3324'	'0.0106'	'0.1034'
\vartheta_E	'0.0777'	'0.1009'	'0.0893'	'0.0189'	'0.1315'
\gamma_L	'0.3547'	'0.4139'	'0.3843'	'0.7233'	'0.1746'
k_L	'5.4096'	'5.5904'	'5.5'	'5.5004'	'0.044'
\lambda_{qf}	'0.6869'	'0.7424'	'0.7146'	'0.0016'	'0.1044'
\delta	'0.062'	'0.0692'	'0.0656'	'0.0867'	'0.0896'
\eta_L	'0.6011'	'0.6482'	'0.6247'	'0.9449'	'0.0838'
\vartheta_P	'0.0048'	'0.0059'	'0.0053'	'0.0111'	'0.0838'
\gamma_H	'0.6637'	'0.7194'	'0.6915'	'0.8343'	'0.0952'
z	'0.7951'	'1.8665'	'1.3308'	'0.3606'	'0.1219'
\eta_{\vartheta}	'0.7971'	'0.8275'	'0.8123'	'0.8306'	'0.0805'
a_L	'4.7369'	'5.8134'	'5.2752'	'11.7089'	'0.1764'
b_L	'6.2591'	'7.2907'	'6.7749'	'14.5312'	'0.1872'
a_{\mu}	'5.985'	'6.5895'	'6.2872'	'2.0504'	'0.102'
b_{\mu}	'6.2624'	'6.9908'	'6.6266'	'1.5495'	'0.0843'
\mu	'0.1763'	'0.2276'	'0.202'	'0.0344'	'0.0975'
a_H	'7.5884'	'8.2738'	'7.9311'	'9.7382'	'0.092'
b_H	'9.696'	'10.437'	'10.0665'	'10.7378'	'0.0893'
\nu	'257.3464'	'291.9012'	'274.6238'	'236.2866'	'0.0993'
BP	'234.3905'	'234.6095'	'234.5'	'234.5'	'0.0514'



### 5.3. Identifiability analysis

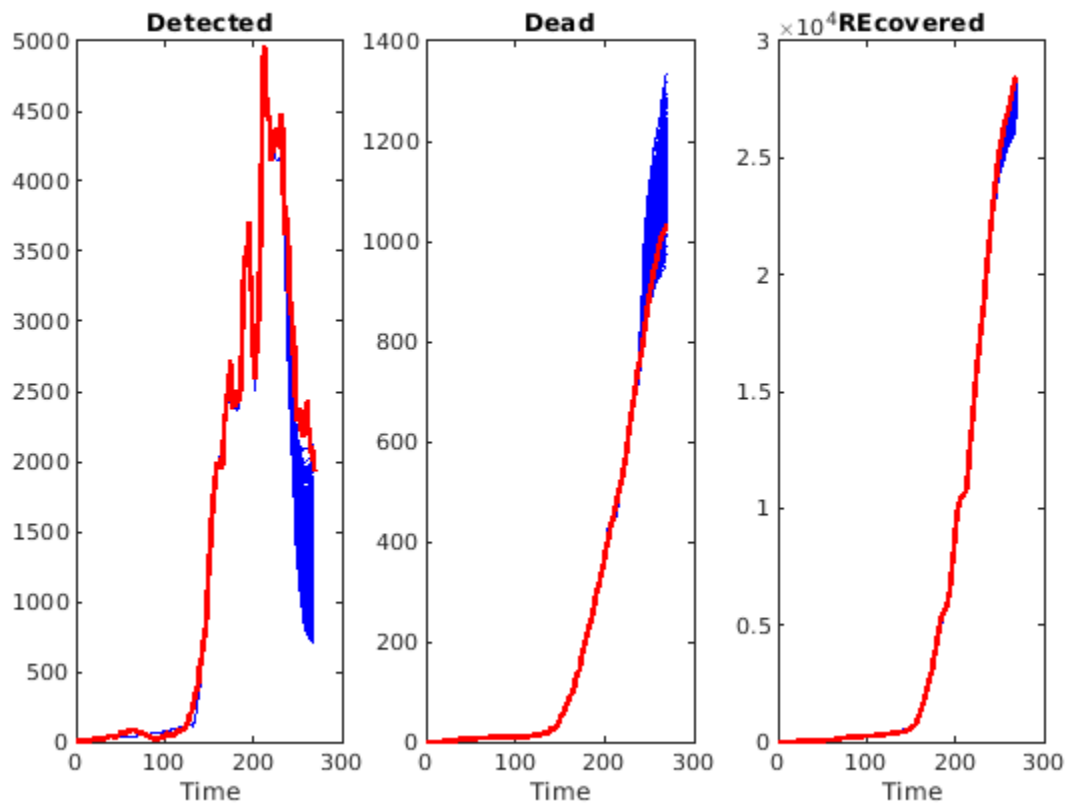






## 5.4. Uncertainty analysis

N=500



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## Chapter 6. Extension number6

### 6.1. Basic information

The extension to be validated consists of the time series from the data270 to the 301. The status of the validation is: COMPLETED.

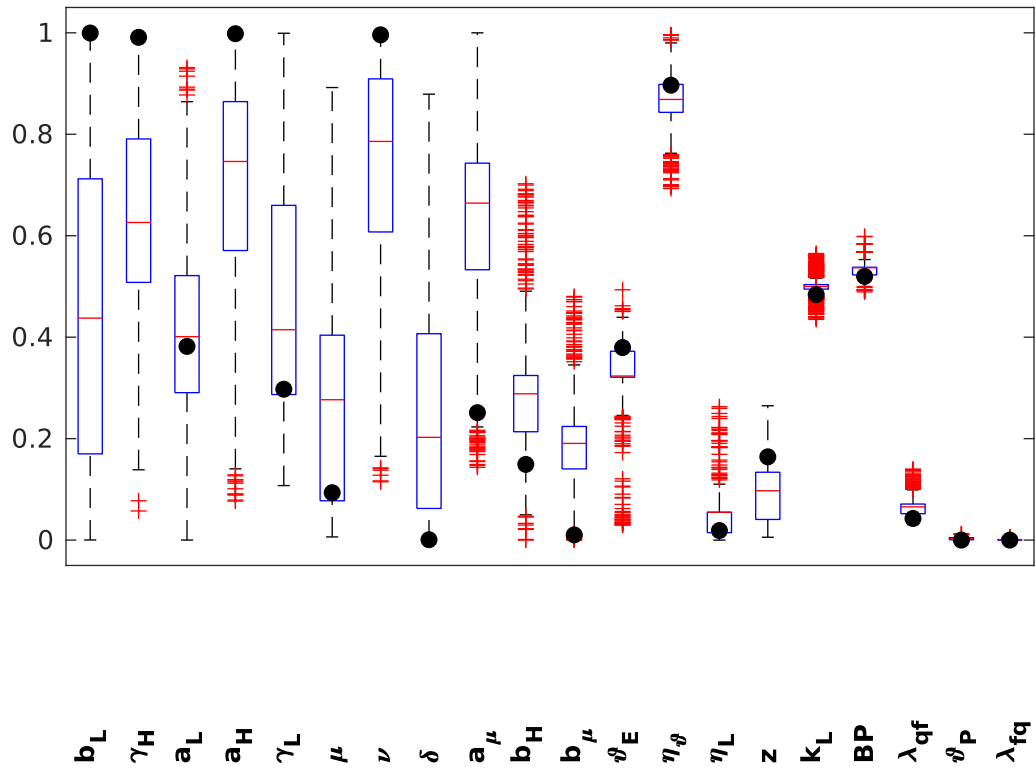
The number of estimations needed to perform the validation was1000.

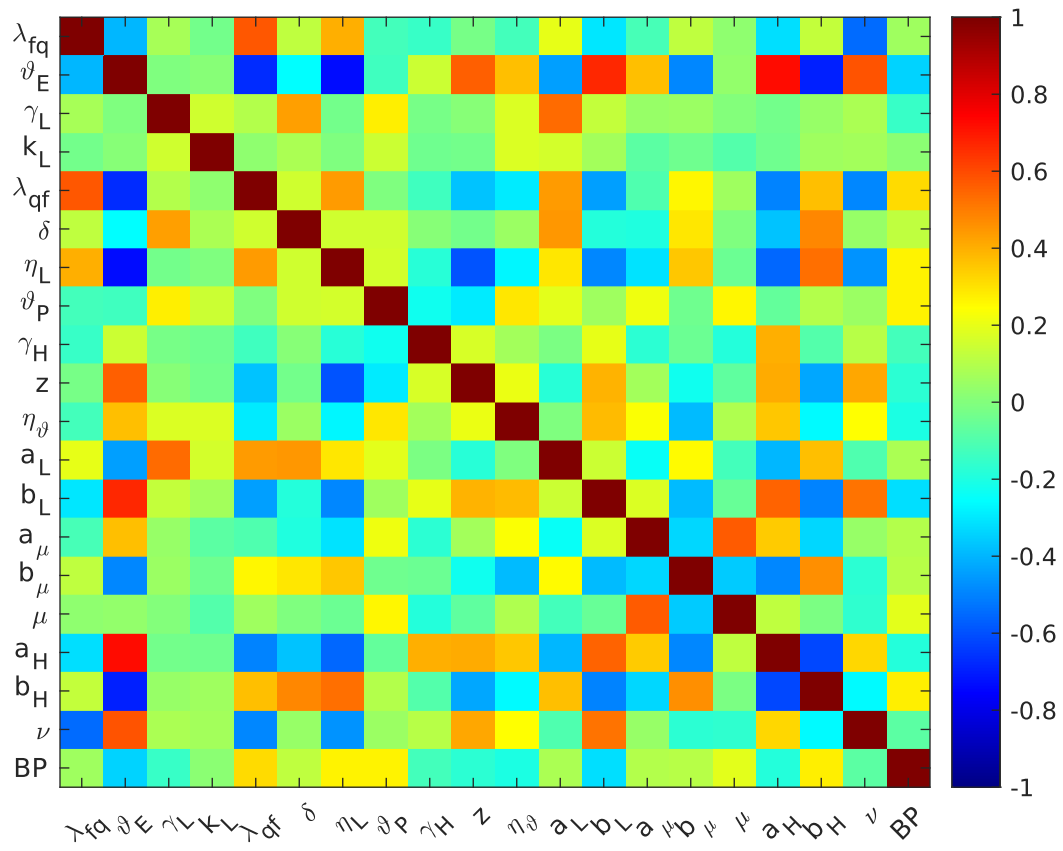
### 6.2. Estimated parameters with their intervals

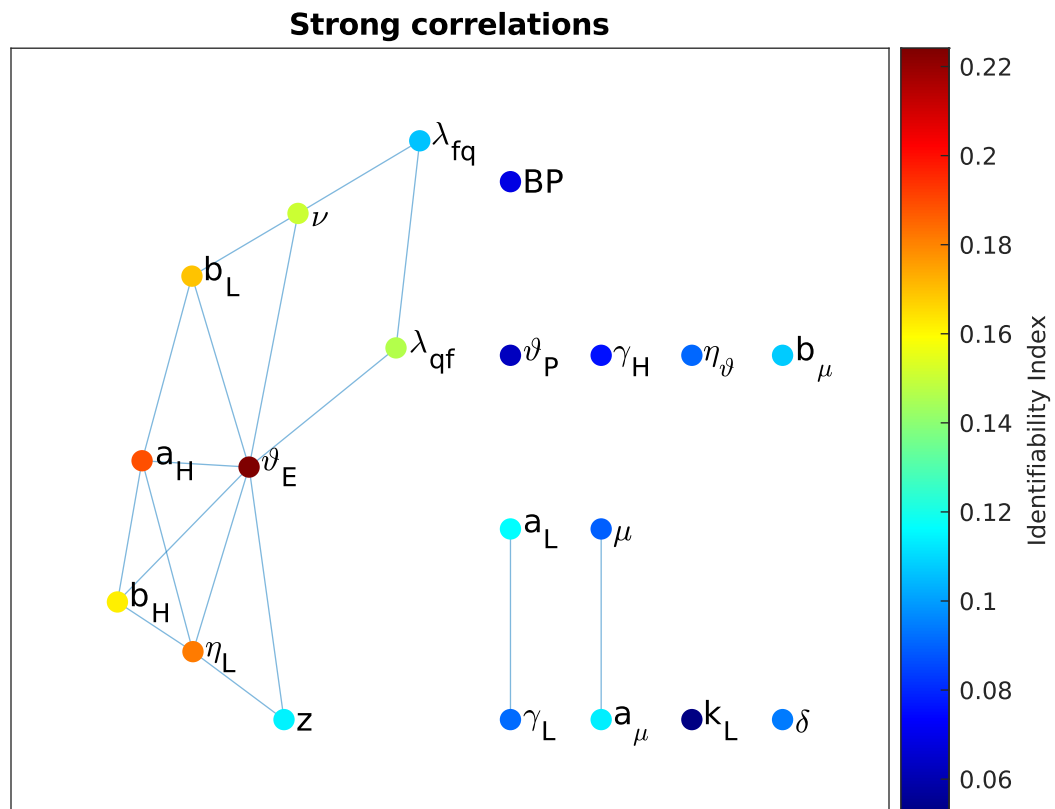
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0182'	'0.001'	'0'	'0.1068'
$\vartheta_E$	'0.3068'	'0.3401'	'0.3235'	'0.3795'	'0.2241'
$\gamma_L$	'0.3898'	'0.4395'	'0.4147'	'0.2974'	'0.0915'
$k_L$	'5.3991'	'5.6'	'5.4996'	'5.3556'	'0.0526'
$\lambda_{qf}$	'0.0406'	'0.0904'	'0.0655'	'0.0426'	'0.1464'
$\delta$	'0.0266'	'0.0341'	'0.0304'	'0.0001'	'0.0946'
$\eta_L$	'0.0269'	'0.0829'	'0.0549'	'0.0188'	'0.1812'
$\vartheta_P$	'0.0023'	'0.003'	'0.0027'	'0'	'0.0632'
$\gamma_H$	'0.6052'	'0.6472'	'0.6262'	'0.9911'	'0.0764'
$z$	'2.7254'	'3.114'	'2.9197'	'4.9247'	'0.1142'
$\eta_{\vartheta}$	'0.8547'	'0.8826'	'0.8687'	'0.8967'	'0.0912'
$a_L$	'6.3145'	'6.9126'	'6.6136'	'6.3461'	'0.1165'
$b_L$	'6.6652'	'7.5882'	'7.1267'	'14.9935'	'0.1698'
$a_{\mu}$	'9.9288'	'10.6723'	'10.3006'	'4.5168'	'0.1142'
$b_{\mu}$	'3.3607'	'3.9763'	'3.6685'	'1.144'	'0.1076'
$\mu$	'0.2553'	'0.298'	'0.2767'	'0.0934'	'0.0896'
$a_H$	'11.038'	'11.8606'	'11.4493'	'14.9755'	'0.189'
$b_H$	'4.696'	'5.38'	'5.038'	'3.0891'	'0.1619'
$\nu$	'378.1953'	'407.7166'	'392.9559'	'498.0009'	'0.1511'
BP	'270.317'	'270.5499'	'270.4334'	'269.3082'	'0.0687'

### 6.3. Identifiability analysys

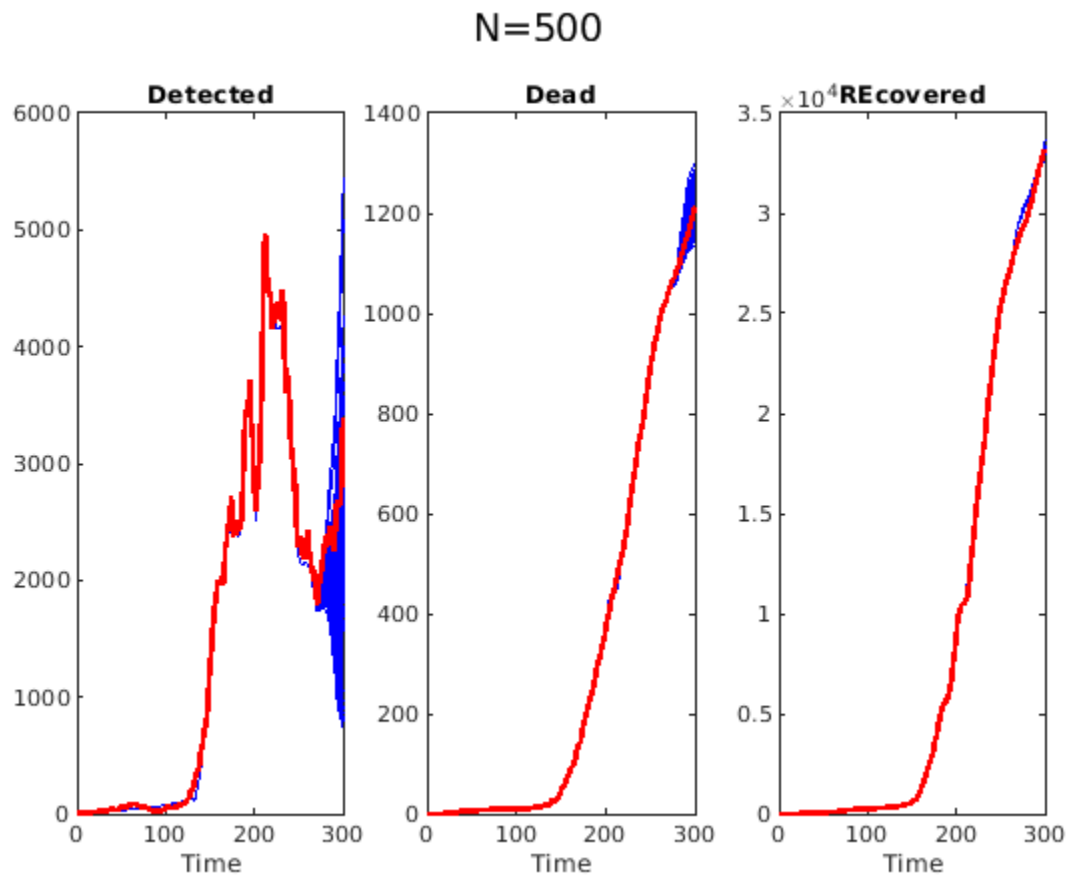








## 6.4. Uncertainty analysis



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## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data301 to the 321. The status of the validation is: COMPLETED.

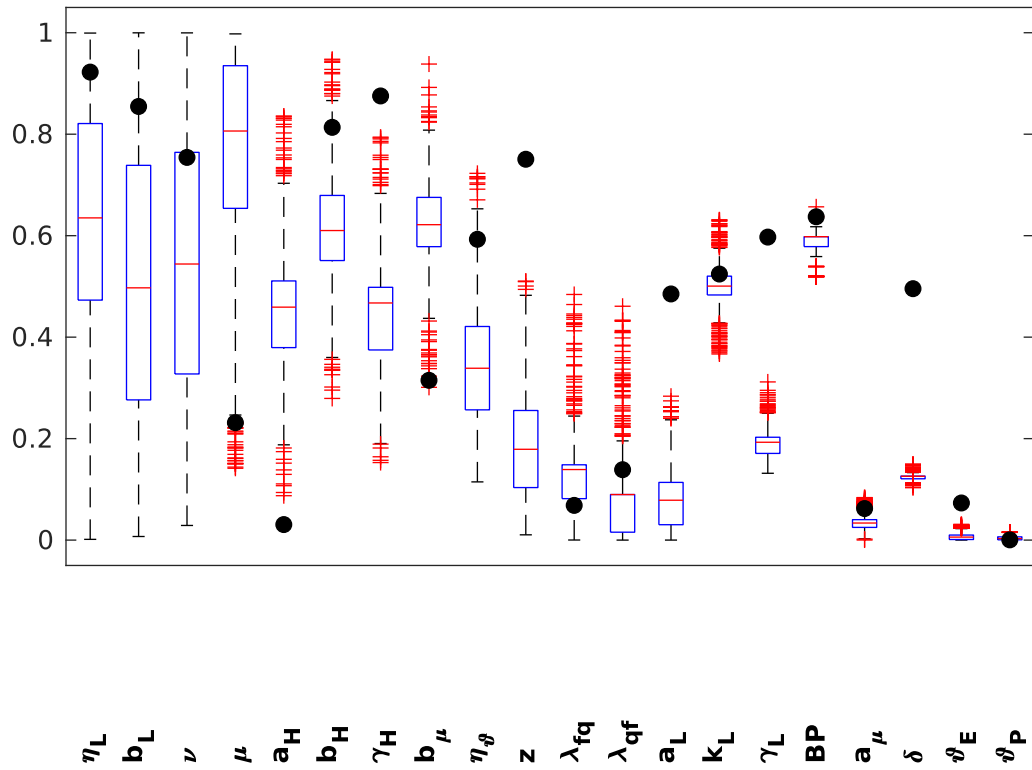
The number of estimations needed to perform the validation was1000.

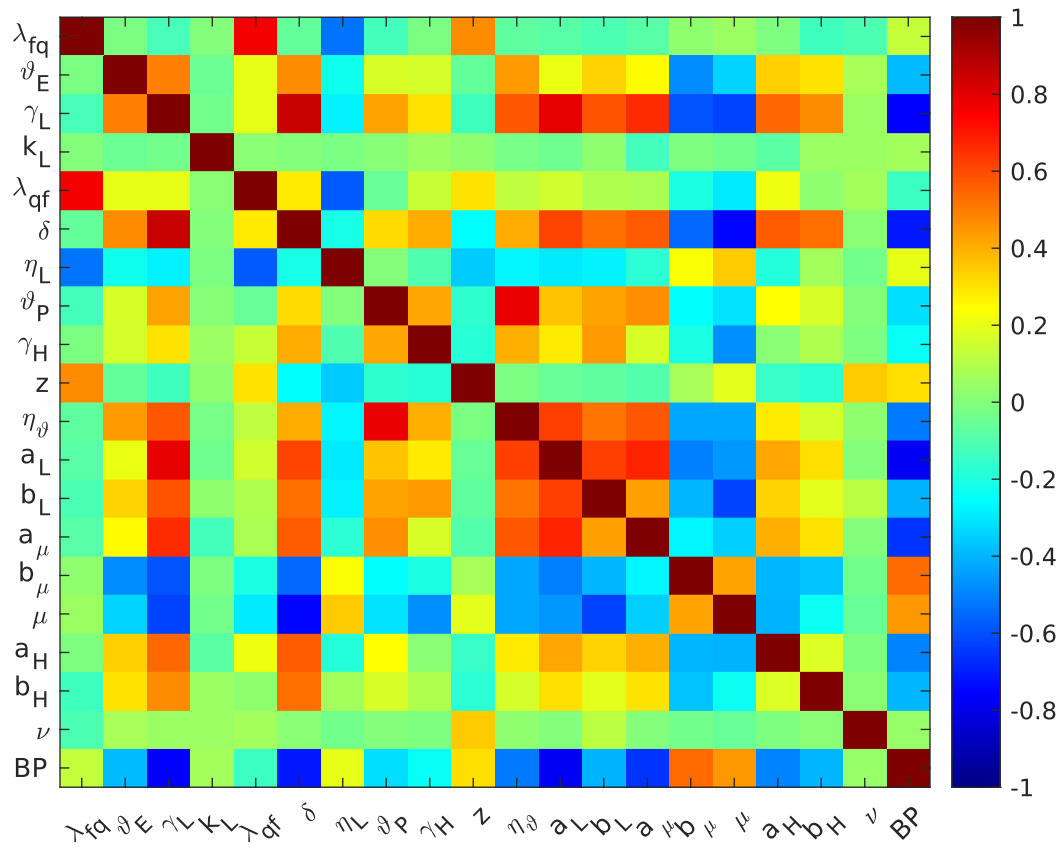
### 7.2. Estimated parameters with their intervals

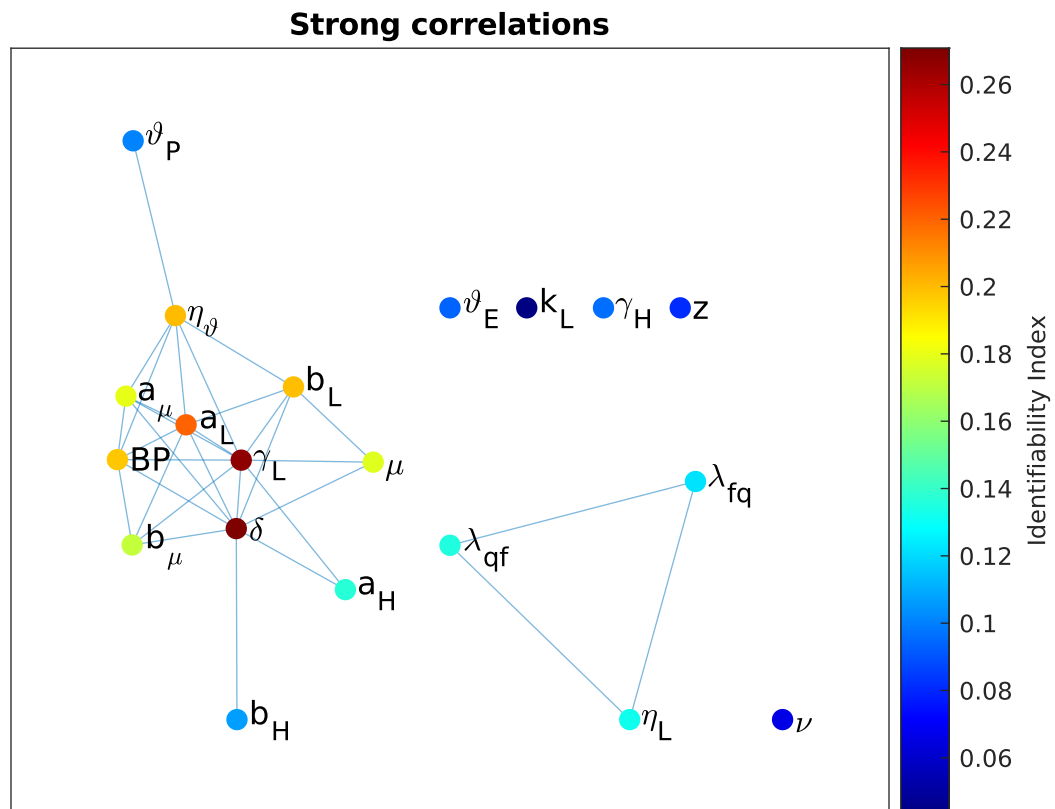
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.103'	'0.1752'	'0.1391'	'0.0684'	'0.122'
$\vartheta_E$	'0'	'0.0129'	'0.0059'	'0.0732'	'0.094'
$\gamma_L$	'0.1694'	'0.2163'	'0.1929'	'0.5972'	'0.2668'
$k_L$	'5.4106'	'5.6004'	'5.5055'	'5.7194'	'0.0439'
$\lambda_{qf}$	'0.0532'	'0.1264'	'0.0898'	'0.1388'	'0.1355'
$\delta$	'0.0141'	'0.0237'	'0.0189'	'0.0743'	'0.2708'
$\eta_L$	'0.6075'	'0.6626'	'0.6351'	'0.9224'	'0.132'
$\vartheta_P$	'0.002'	'0.0041'	'0.0031'	'0.0005'	'0.101'
$\gamma_H$	'0.4467'	'0.4881'	'0.4674'	'0.8754'	'0.0969'
$z$	'4.9559'	'5.7832'	'5.3695'	'22.5189'	'0.0814'
$\eta_{\vartheta}$	'0.322'	'0.3555'	'0.3387'	'0.5929'	'0.2'
$a_L$	'1.8653'	'2.335'	'2.1001'	'7.7919'	'0.2201'
$b_L$	'7.5349'	'8.3867'	'7.9608'	'12.965'	'0.1992'
$a_{\mu}$	'1.2831'	'1.6588'	'1.471'	'1.8703'	'0.18'
$b_{\mu}$	'9.384'	'10.0225'	'9.7033'	'5.4089'	'0.1724'
$\mu$	'0.7755'	'0.837'	'0.8063'	'0.2314'	'0.1785'
$a_H$	'7.1224'	'7.7335'	'7.428'	'1.4284'	'0.1375'
$b_H$	'9.2978'	'9.7856'	'9.5417'	'12.3892'	'0.1069'
$\nu$	'257.8996'	'286.2484'	'272.074'	'377.1375'	'0.0665'
BP	'300.3284'	'300.6716'	'300.5'	'302.5'	'0.1973'

### 7.3. Identifiability analysis

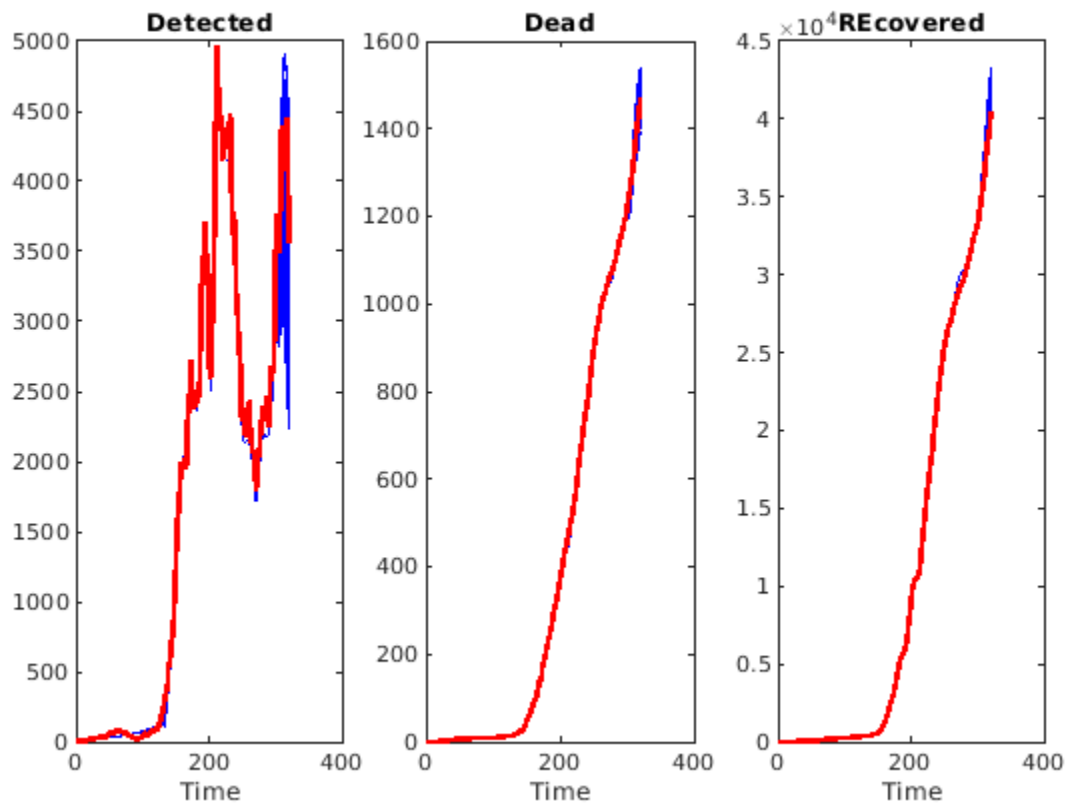






## 7.4. Uncertainty analysis

N=500



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## Chapter 8. Extension number8

### 8.1. Basic information

The extension to be validated consists of the time series from the data321 to the 340. The status of the validation is: COMPLETED.

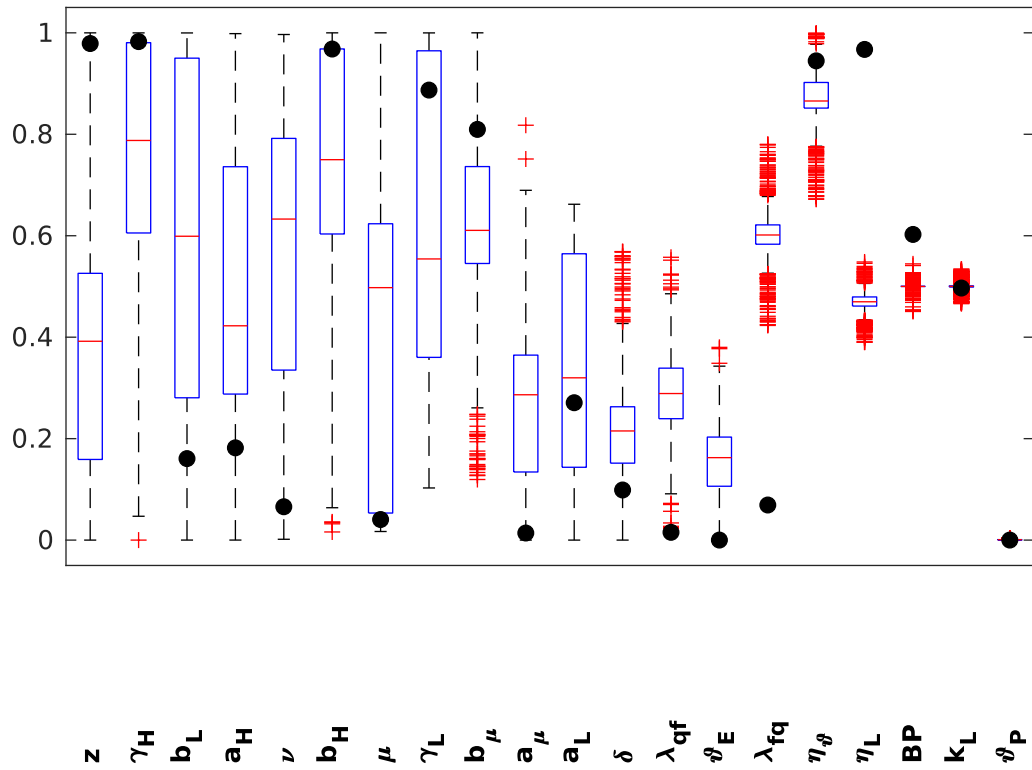
The number of estimations needed to perform the validation was1000.

### 8.2. Estimated parameters with their intervals

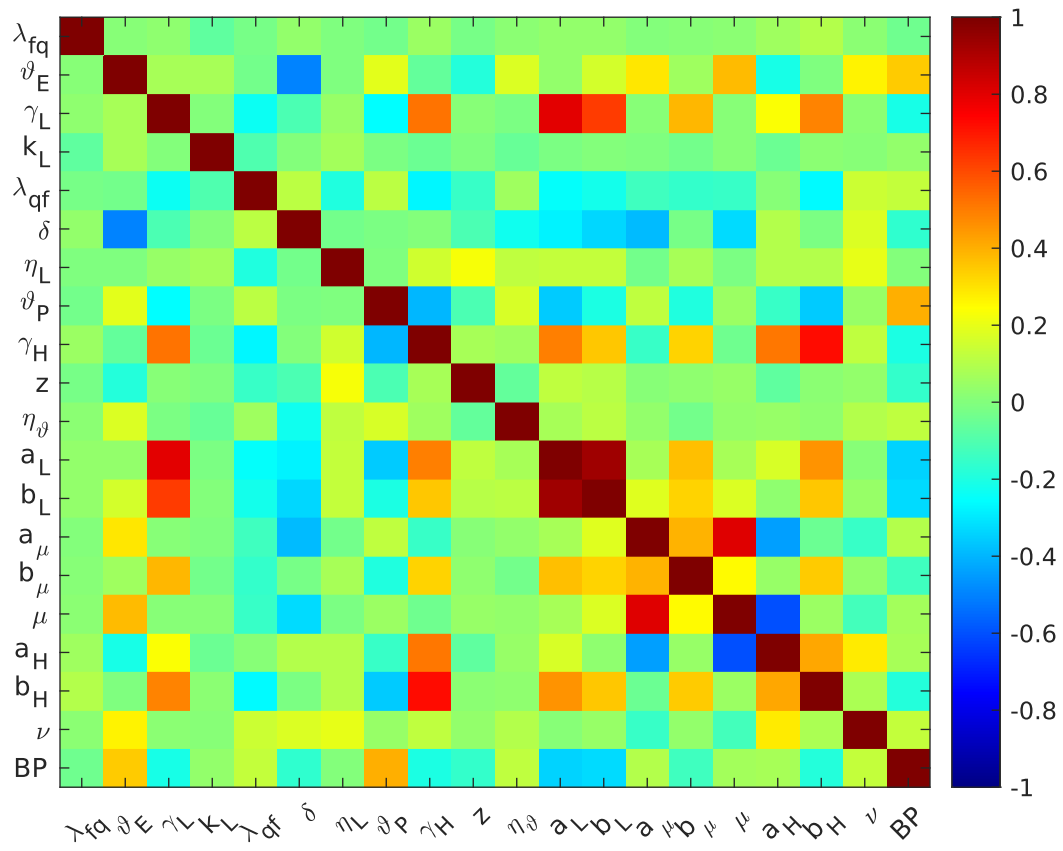
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

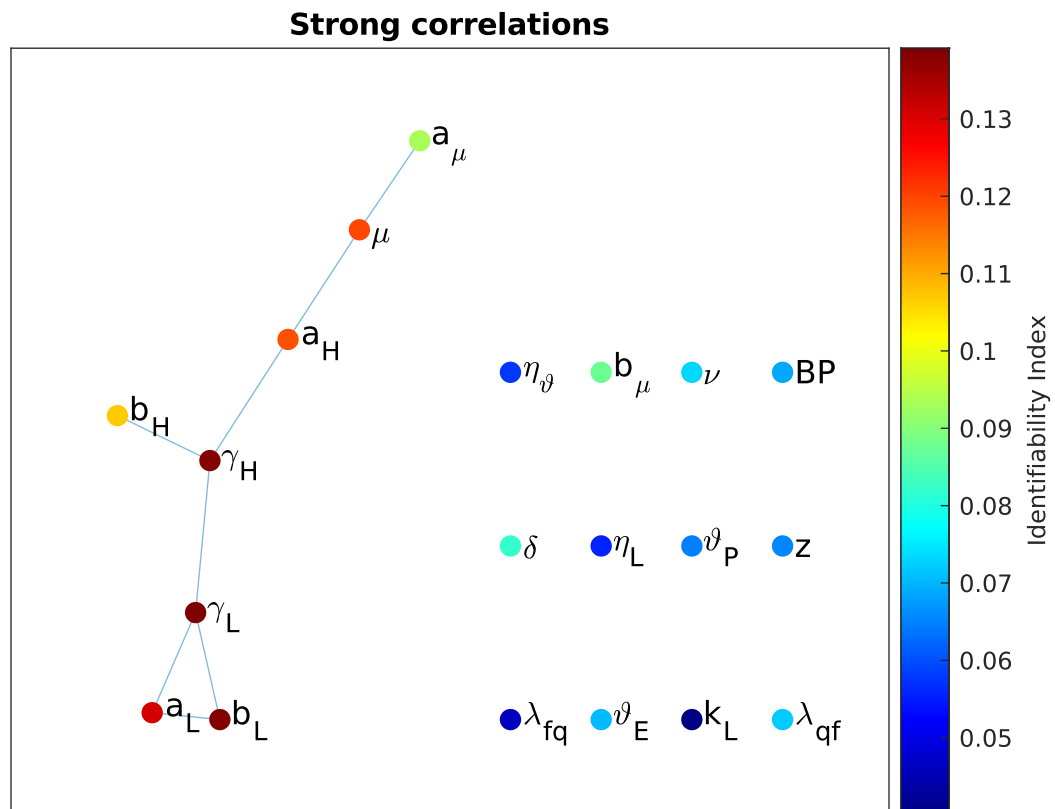
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.5878'	'0.6152'	'0.6015'	'0.0692'	'0.0462'
$\vartheta_E$	'0.155'	'0.1701'	'0.1625'	'0.0001'	'0.0705'
$\gamma_L$	'0.5284'	'0.5801'	'0.5543'	'0.8871'	'0.1391'
$k_L$	'5.4293'	'5.5737'	'5.5015'	'5.4719'	'0.0404'
$\lambda_{qf}$	'0.2756'	'0.3023'	'0.2889'	'0.0153'	'0.0722'
$\delta$	'0.0291'	'0.0354'	'0.0323'	'0.0148'	'0.0823'
$\eta_L$	'0.4591'	'0.4805'	'0.4698'	'0.9673'	'0.056'
$\vartheta_P$	'0.0003'	'0.0011'	'0.0007'	'0.0001'	'0.0648'
$\gamma_H$	'0.7691'	'0.8065'	'0.7878'	'0.9827'	'0.1382'
$z$	'11.1062'	'12.4124'	'11.7593'	'29.3671'	'0.0657'
$\eta_{\vartheta}$	'0.8517'	'0.8795'	'0.8656'	'0.9448'	'0.0577'
$a_L$	'5.2193'	'5.7381'	'5.4787'	'4.7913'	'0.131'
$b_L$	'8.9635'	'9.8084'	'9.3859'	'3.2494'	'0.1386'
$a_{\mu}$	'4.8166'	'5.2056'	'5.0111'	'1.1954'	'0.0934'
$b_{\mu}$	'9.2368'	'9.8591'	'9.5479'	'12.3348'	'0.0875'
$\mu$	'0.4686'	'0.5268'	'0.4977'	'0.0406'	'0.1196'
$a_H$	'6.5755'	'7.2539'	'6.9147'	'3.5463'	'0.119'
$b_H$	'11.2366'	'11.7613'	'11.4989'	'14.5525'	'0.1067'
$\nu$	'304.5937'	'328.2784'	'316.4361'	'32.8718'	'0.0735'
BP	'320.3274'	'320.6732'	'320.5003'	'324.5'	'0.0686'

### 8.3. Identifiability analysis

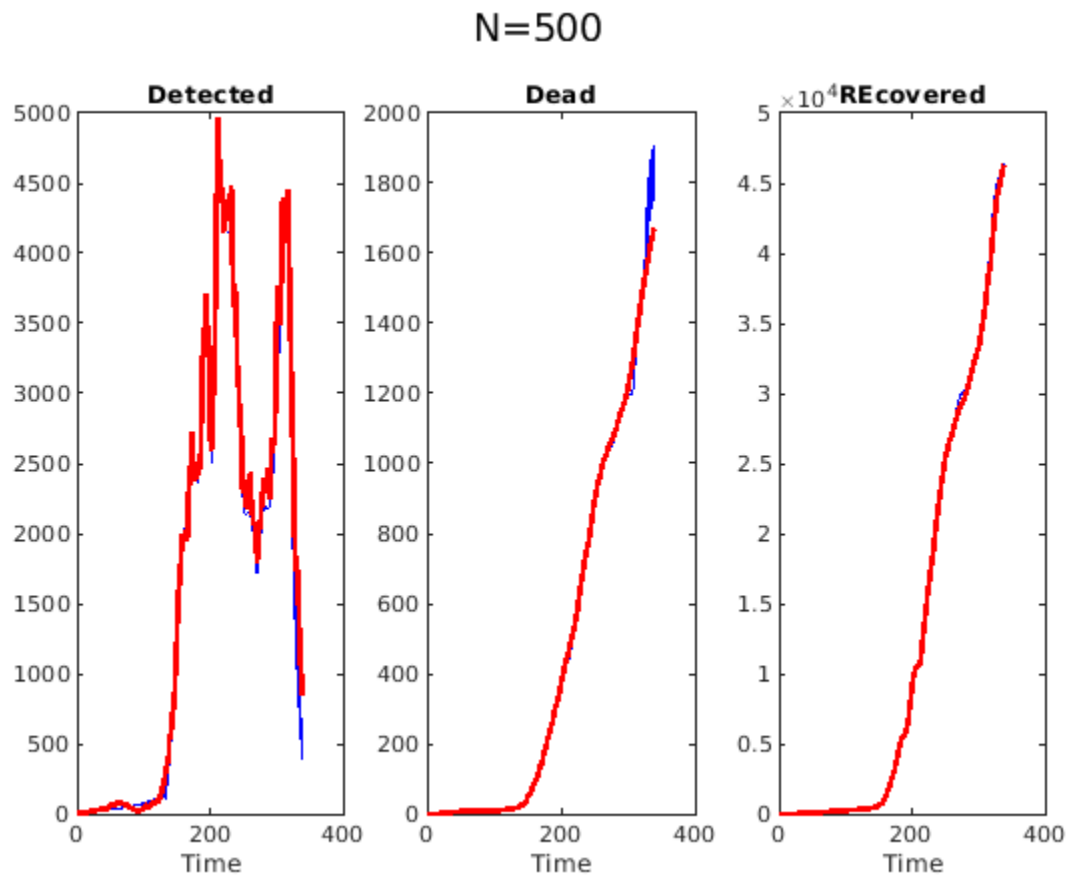








## 8.4. Uncertainty analysys



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## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data340 to the 355. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

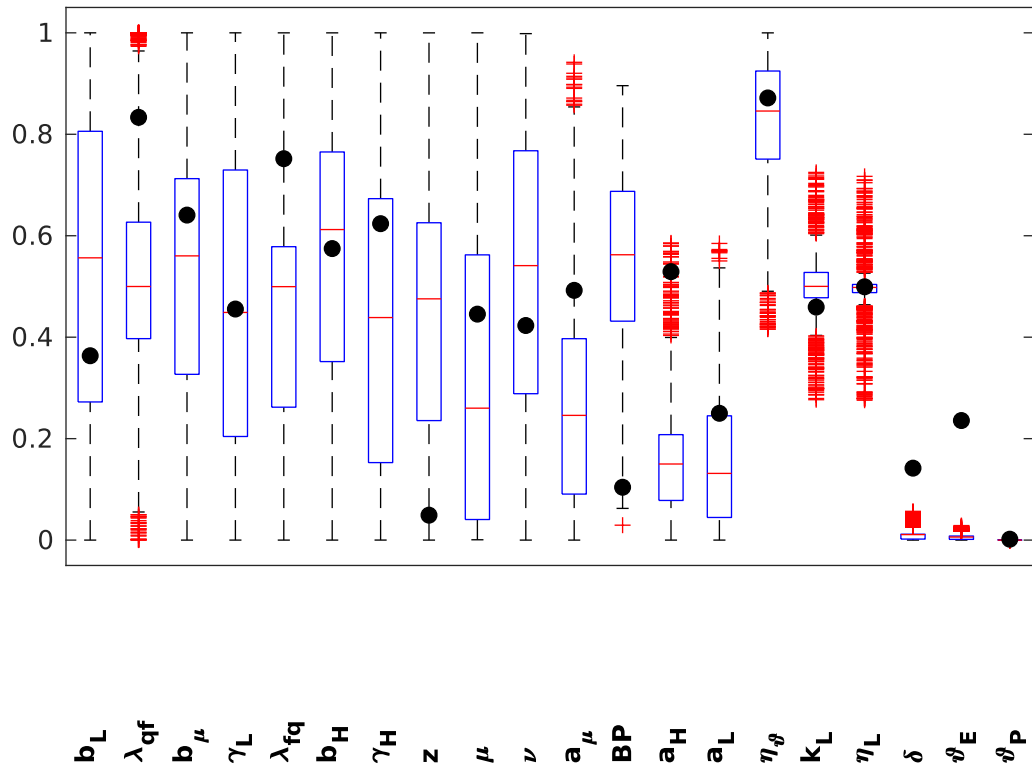
### 9.2. Estimated parameters with their intervals

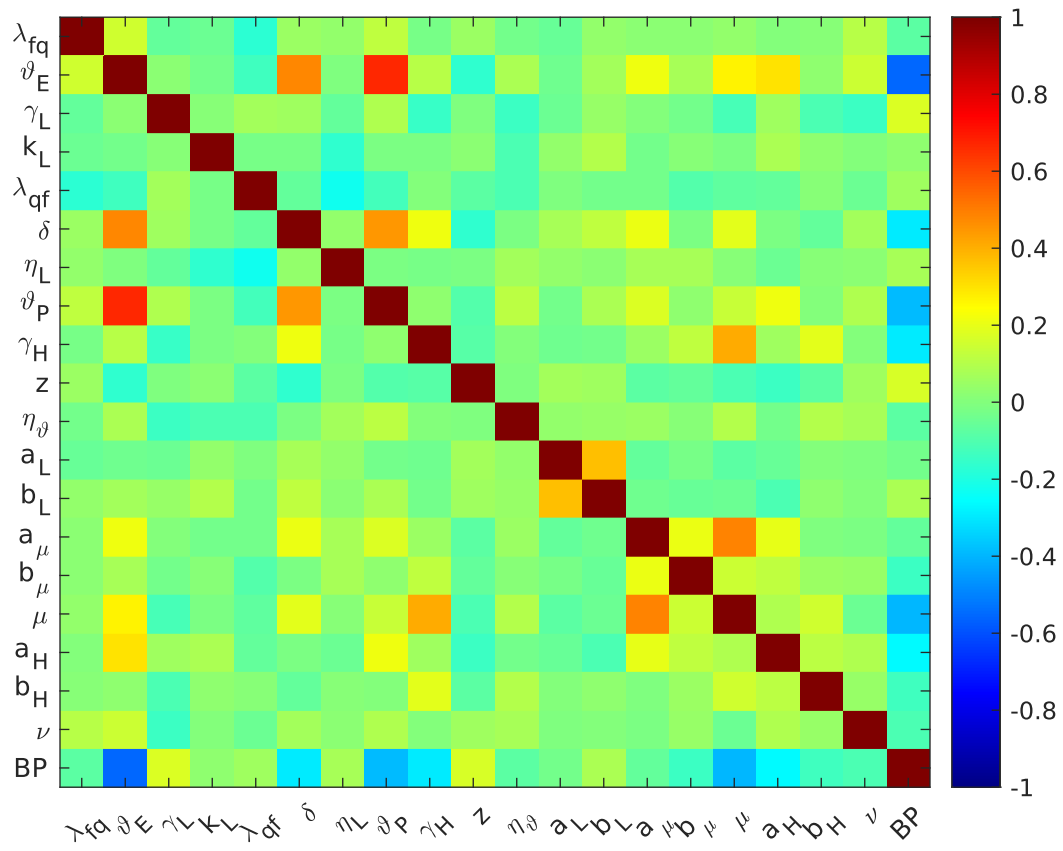
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

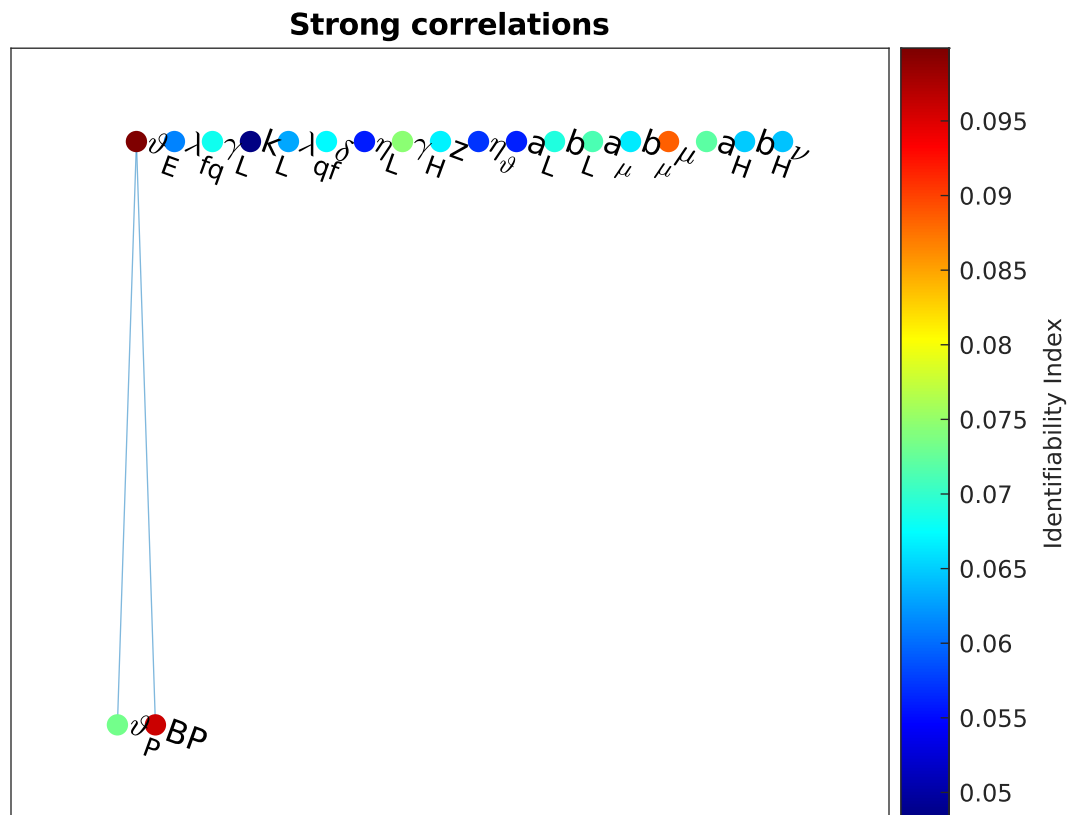
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.6736'	'0.7808'	'0.4996'	'0.7519'	'0.0614'
$\vartheta_E$	'0.2131'	'0.2358'	'0.006'	'0.2357'	'0.0999'
$\gamma_L$	'0.4314'	'0.6631'	'0.4488'	'0.4555'	'0.0684'
$k_L$	'4.6345'	'7.6189'	'5.5015'	'5.1344'	'0.0483'
$\lambda_{qf}$	'0.7185'	'0.8543'	'0.4999'	'0.8334'	'0.0632'
$\delta$	'0.0114'	'0.0261'	'0.0016'	'0.0213'	'0.0673'
$\eta_L$	'0.468'	'0.9604'	'0.4981'	'0.4993'	'0.0559'
$\vartheta_P$	'0.0006'	'0.0019'	'0'	'0.0018'	'0.0733'
$\gamma_H$	'0.367'	'0.6259'	'0.4387'	'0.6238'	'0.0745'
$z$	'1.3369'	'2.0732'	'14.2679'	'1.4747'	'0.0669'
$\eta_{\vartheta}$	'0.825'	'0.9497'	'0.8458'	'0.8716'	'0.0572'
$a_L$	'4.1761'	'4.5181'	'2.8422'	'4.4996'	'0.0561'
$b_L$	'5.9237'	'7.8746'	'8.7902'	'6.0881'	'0.0691'
$a_{\mu}$	'3.5678'	'8.258'	'4.4446'	'7.8929'	'0.0714'
$b_{\mu}$	'4.4768'	'12.8926'	'8.8442'	'9.9699'	'0.0665'
$\mu$	'0.1699'	'0.8257'	'0.2601'	'0.4455'	'0.0885'
$a_H$	'4.0882'	'9.0262'	'3.1022'	'8.4082'	'0.0721'
$b_H$	'4.1245'	'13.8649'	'9.5706'	'9.0455'	'0.0648'
$\nu$	'176.2897'	'224.129'	'270.5418'	'211.5206'	'0.0645'
BP	'323.4'	'325.15'	'334.5'	'323.5'	'0.096'

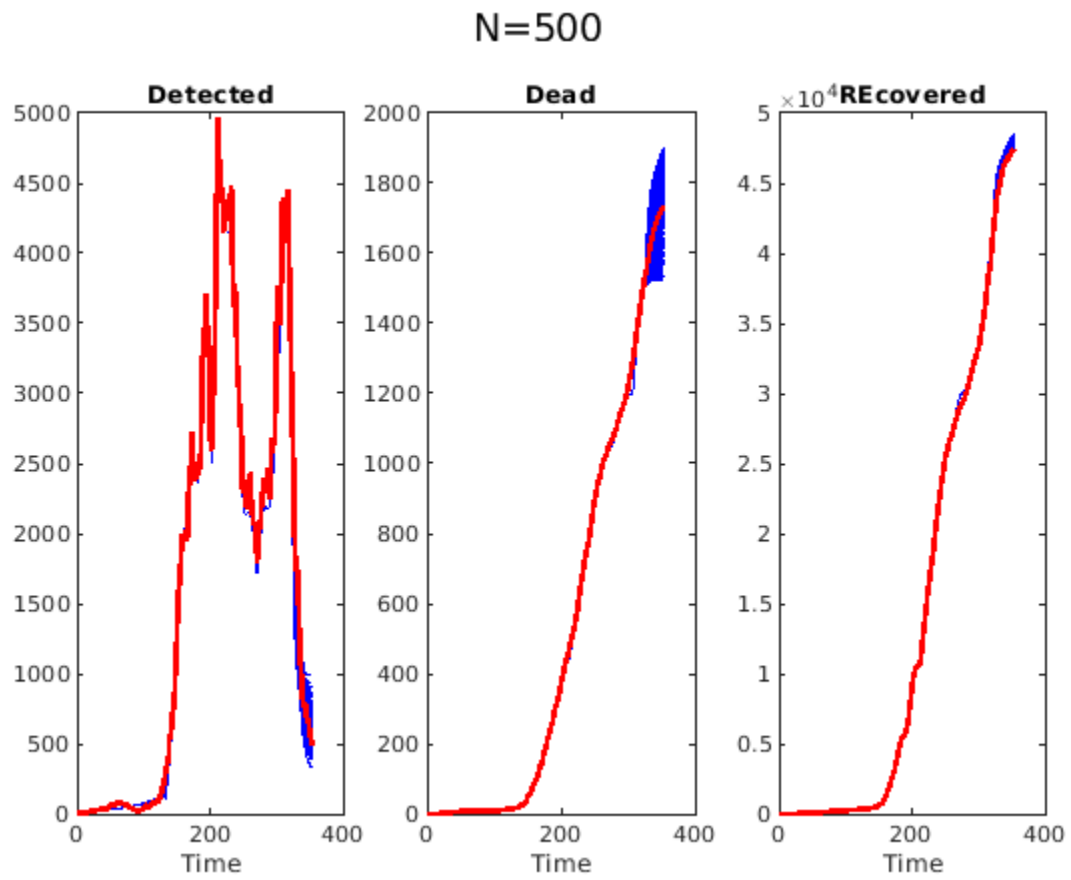
### 9.3. Identifiability analysis







## 9.4. Uncertainty analysys





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## Chapter 10. Extension number10

### 10.1. Basic information

The extension to be validated consists of the time series from the data355 to the 459. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

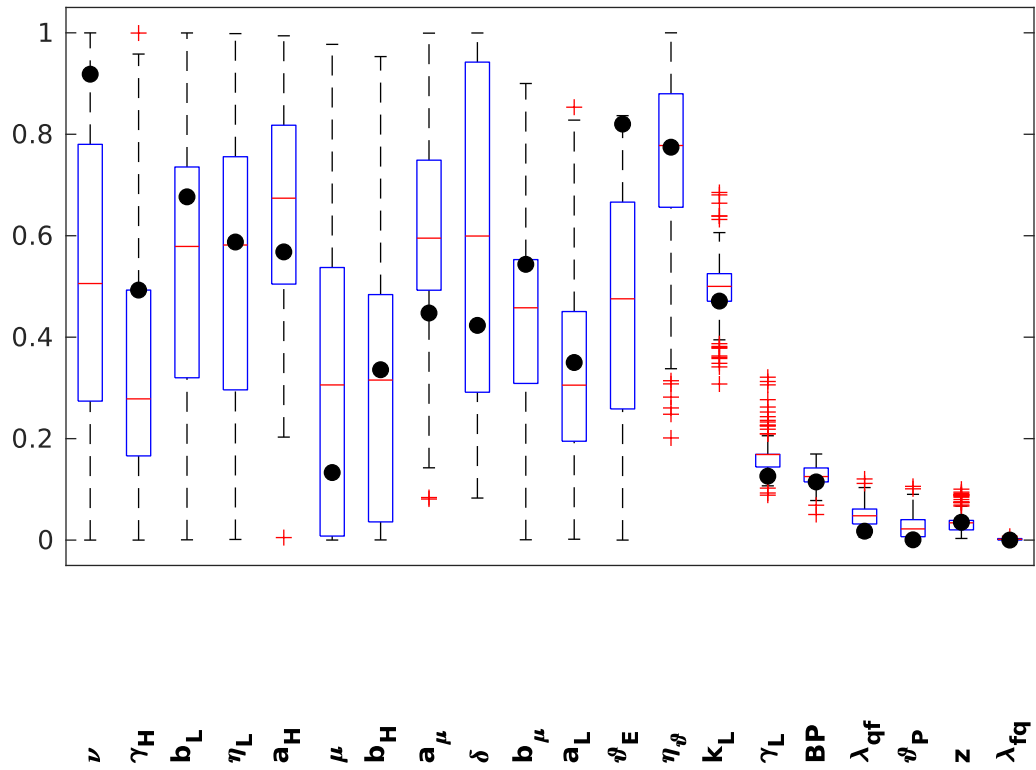
### 10.2. Estimated parameters with their intervals

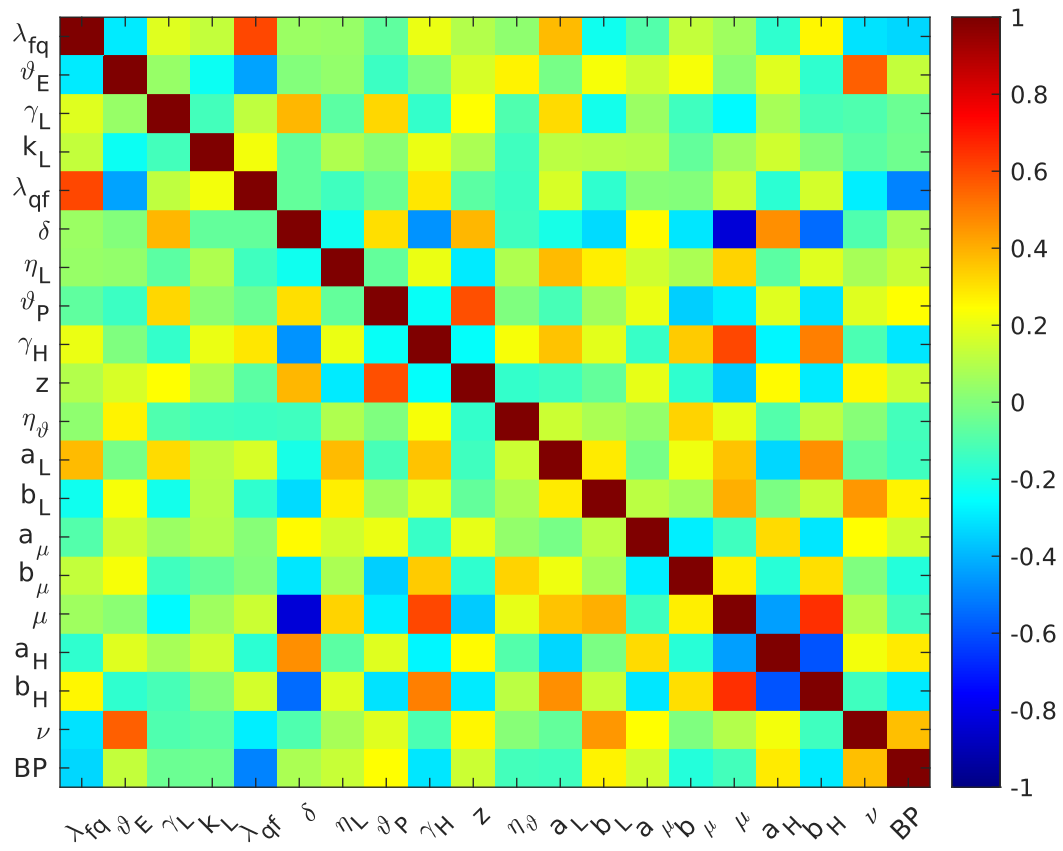
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

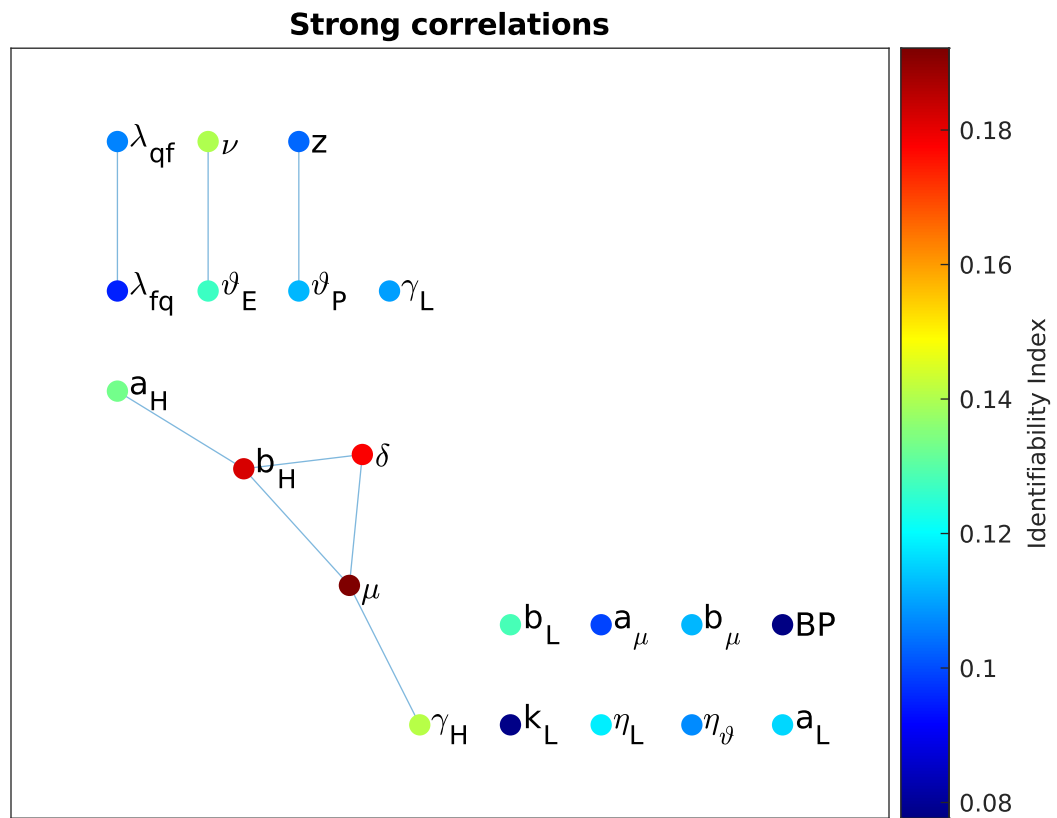
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0001'	'0.0015'	'0'	'0.0952'
$\vartheta_E$	'0.7693'	'0.8235'	'0.4757'	'0.8201'	'0.1272'
$\gamma_L$	'0.0943'	'0.1357'	'0.1691'	'0.1261'	'0.1095'
$k_L$	'1.171'	'9.55'	'5.5014'	'5.2404'	'0.0785'
$\lambda_{qf}$	'0.0122'	'0.018'	'0.048'	'0.0176'	'0.1063'
$\delta$	'0'	'0.1357'	'0.0899'	'0.0635'	'0.178'
$\eta_L$	'0.4998'	'0.924'	'0.5817'	'0.5876'	'0.1187'
$\vartheta_P$	'0'	'0.0009'	'0.0222'	'0.0006'	'0.1126'
$\gamma_H$	'0.0494'	'0.9525'	'0.2784'	'0.4928'	'0.141'
$z$	'0.9217'	'1.142'	'1.0214'	'1.0543'	'0.1032'
$\eta_{\vartheta}$	'0.6111'	'0.9797'	'0.7774'	'0.7745'	'0.1073'
$a_L$	'2.3192'	'6.7432'	'5.2891'	'5.901'	'0.116'
$b_L$	'7.3267'	'15'	'9.1044'	'10.4733'	'0.1284'
$a_{\mu}$	'1.7'	'14.468'	'9.2692'	'7.2672'	'0.0994'
$b_{\mu}$	'1'	'13.2573'	'7.4178'	'8.6107'	'0.1123'
$\mu$	'0.0221'	'0.2996'	'0.3059'	'0.1331'	'0.1922'
$a_H$	'1'	'13.6'	'10.436'	'8.9538'	'0.1335'
$b_H$	'2.4874'	'15'	'5.4164'	'5.7017'	'0.1819'
$\nu$	'354.8359'	'480.0354'	'252.8812'	'459.2122'	'0.1402'
BP	'352.0991'	'367.034'	'353.6029'	'352.5'	'0.0777'

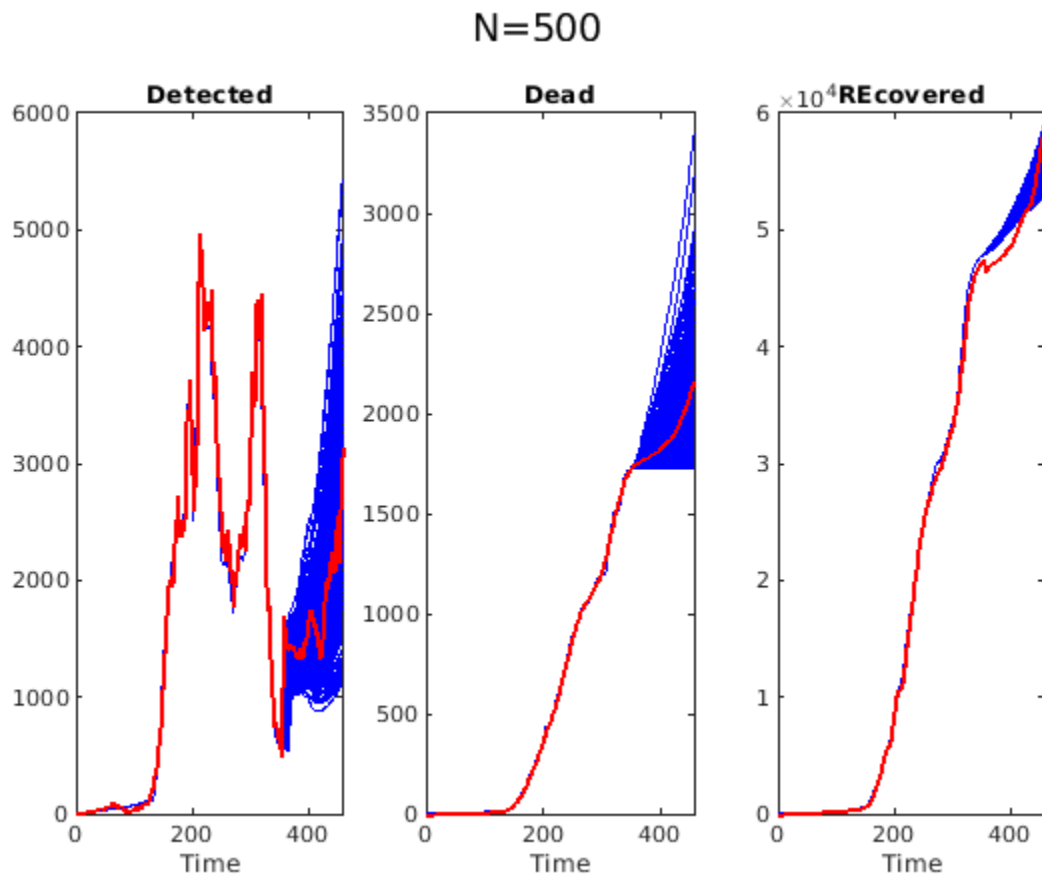
### 10.3. Identifiability analysis







## 10.4. Uncertainty analysis



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## Chapter 11. Extension number11

### 11.1. Basic information

The extension to be validated consists of the time series from the data459 to the 471. The status of the validation is: COMPLETED.

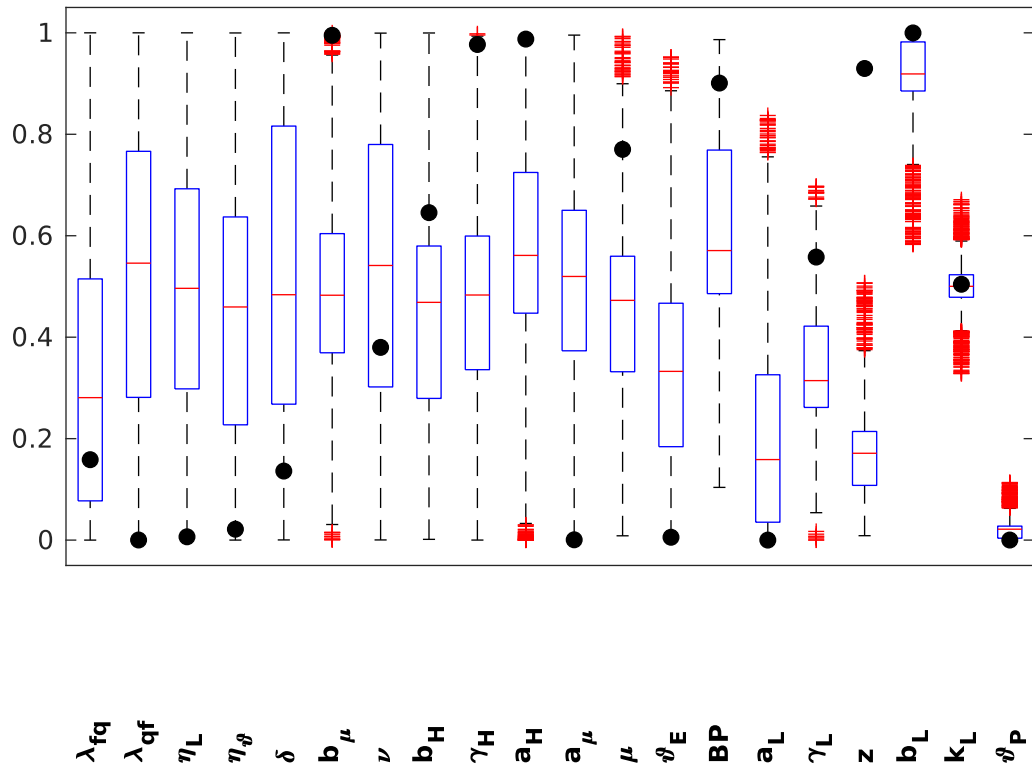
The number of estimations needed to perform the validation was1000.

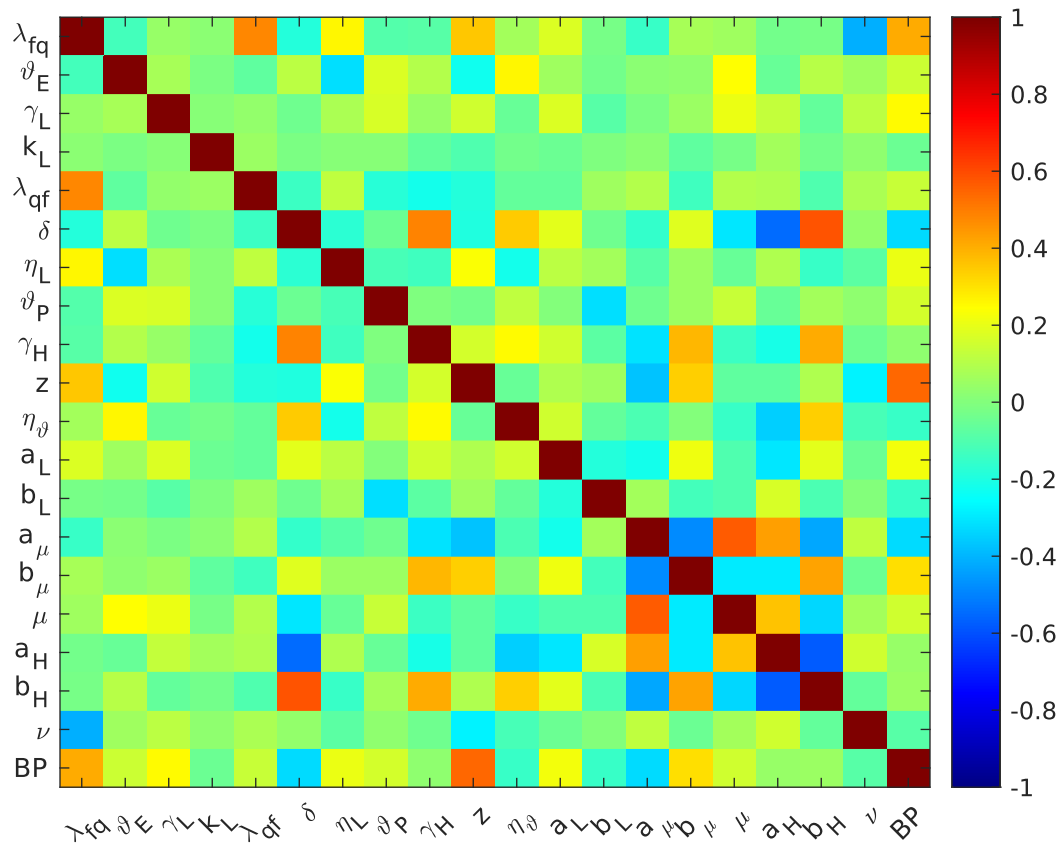
### 11.2. Estimated parameters with their intervals

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

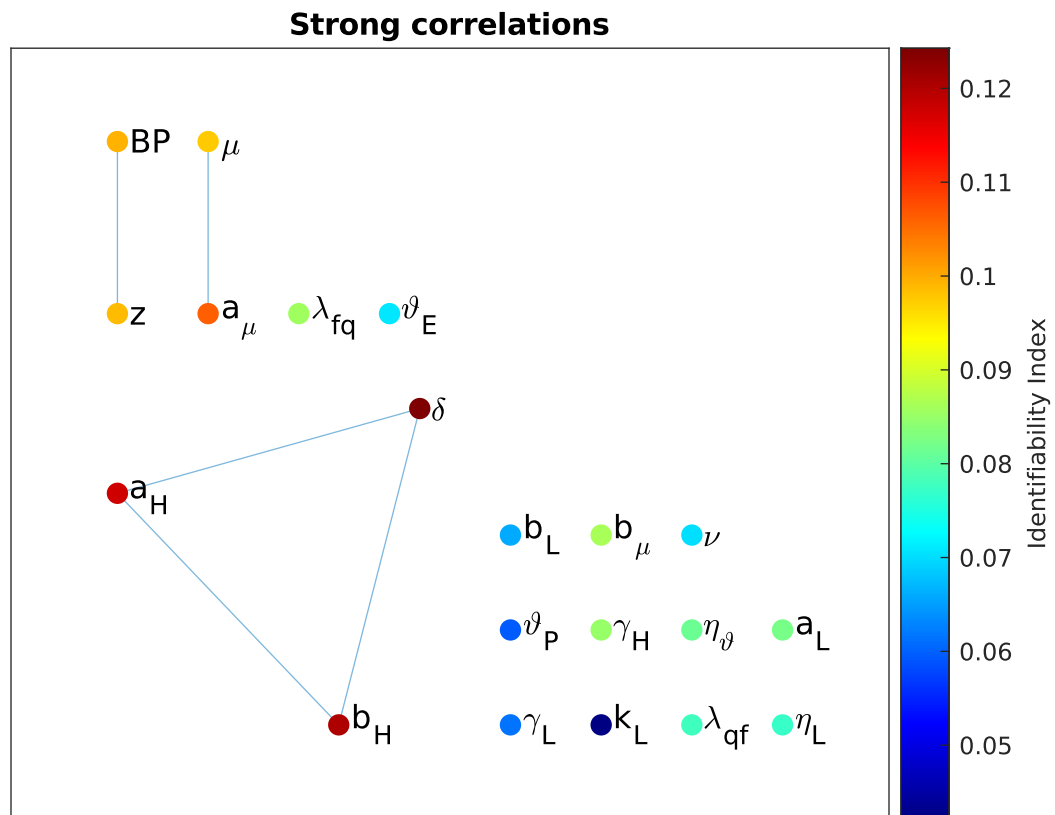
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.2582'	'0.3034'	'0.2808'	'0.1585'	'0.0856'
$\vartheta_E$	'0.3143'	'0.351'	'0.3326'	'0.0056'	'0.0709'
$\gamma_L$	'0.3004'	'0.3286'	'0.3145'	'0.5579'	'0.0615'
$k_L$	'5.4202'	'5.5854'	'5.5028'	'5.539'	'0.0422'
$\lambda_{qf}$	'0.5228'	'0.5691'	'0.5459'	'0.0002'	'0.078'
$\delta$	'0.0691'	'0.0761'	'0.0726'	'0.0204'	'0.1243'
$\eta_L$	'0.4756'	'0.517'	'0.4963'	'0.0065'	'0.0772'
$\vartheta_P$	'0.0091'	'0.034'	'0.0215'	'0.0001'	'0.0597'
$\gamma_H$	'0.4641'	'0.5022'	'0.4832'	'0.977'	'0.085'
$z$	'4.6503'	'5.6327'	'5.1415'	'27.8913'	'0.0988'
$\eta_{\vartheta}$	'0.4393'	'0.4799'	'0.4596'	'0.0215'	'0.0814'
$a_L$	'2.892'	'3.5592'	'3.2256'	'1.0003'	'0.0824'
$b_L$	'13.5872'	'14.1423'	'13.8647'	'14.9971'	'0.0662'
$a_{\mu}$	'8.0144'	'8.5379'	'8.2761'	'1.0081'	'0.1061'
$b_{\mu}$	'7.5227'	'7.9933'	'7.758'	'14.9314'	'0.0862'
$\mu$	'0.4555'	'0.4897'	'0.4726'	'0.7702'	'0.0976'
$a_H$	'8.6117'	'9.1022'	'8.857'	'14.827'	'0.1176'
$b_H$	'7.297'	'7.8258'	'7.5614'	'10.0372'	'0.1203'
$\nu$	'259.409'	'281.9511'	'270.6801'	'189.9577'	'0.0704'
BP	'413.8754'	'417.1246'	'415.5'	'450.4999'	'0.0994'

### 11.3. Identifiability analysis



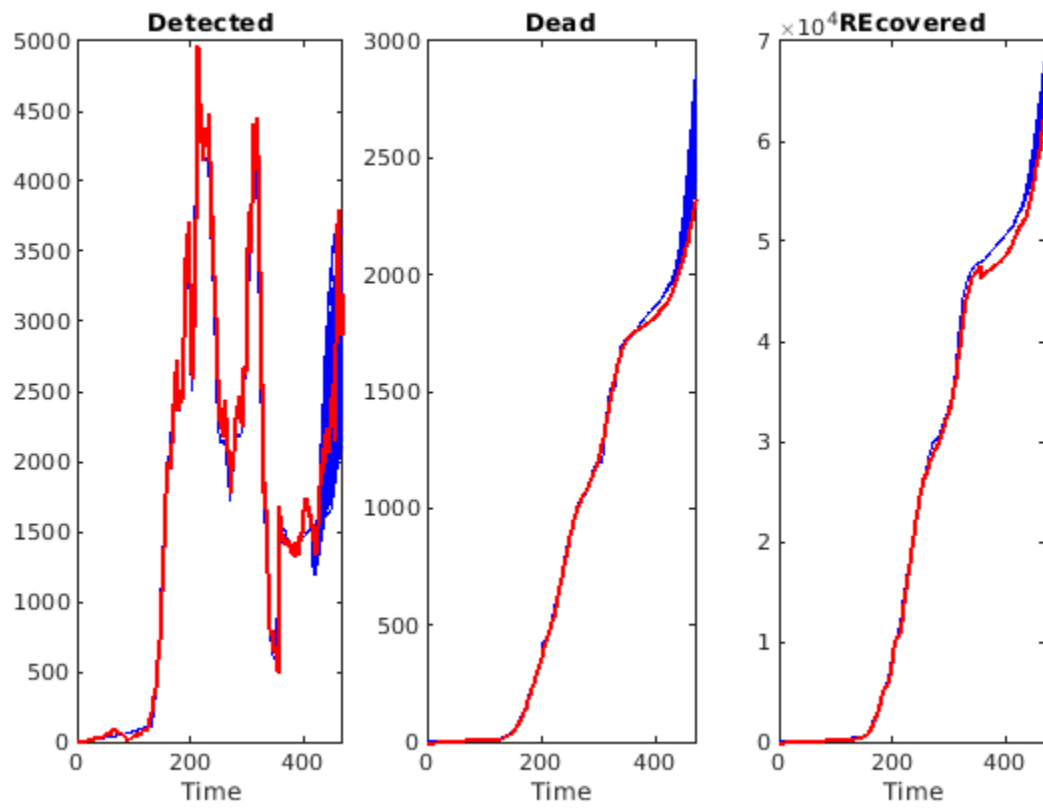






## 11.4. Uncertainty analysis

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 data471 to the 480. The status of the validation is: COMPLETED.

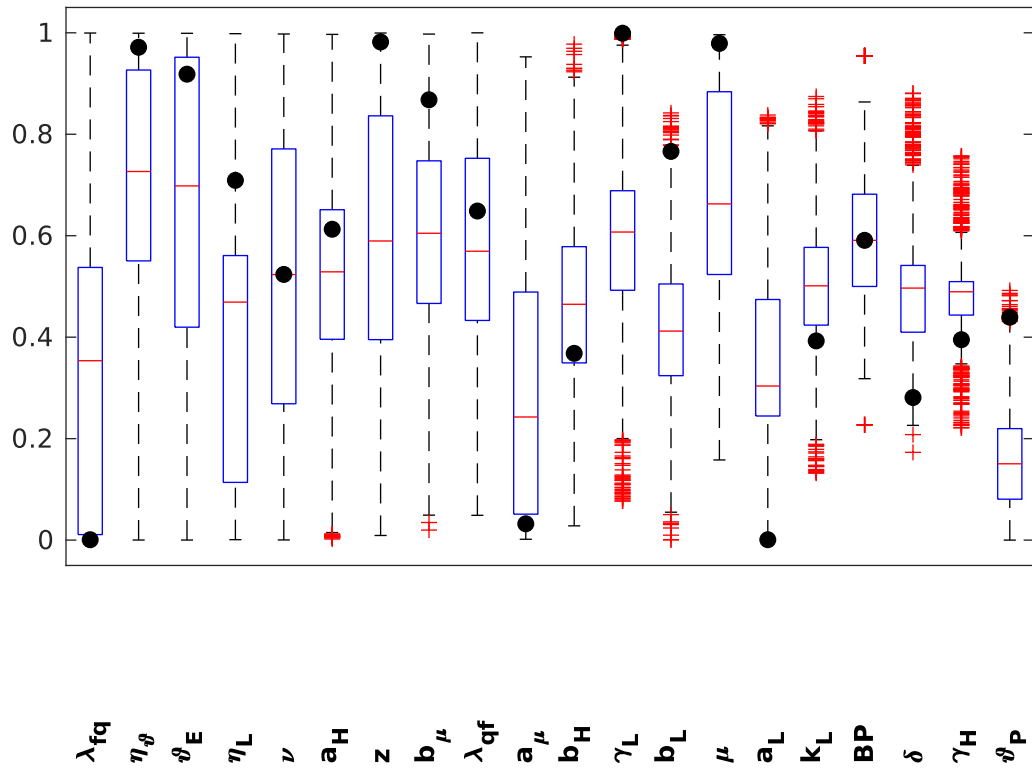
The number of estimations needed to perform the validation was1000.

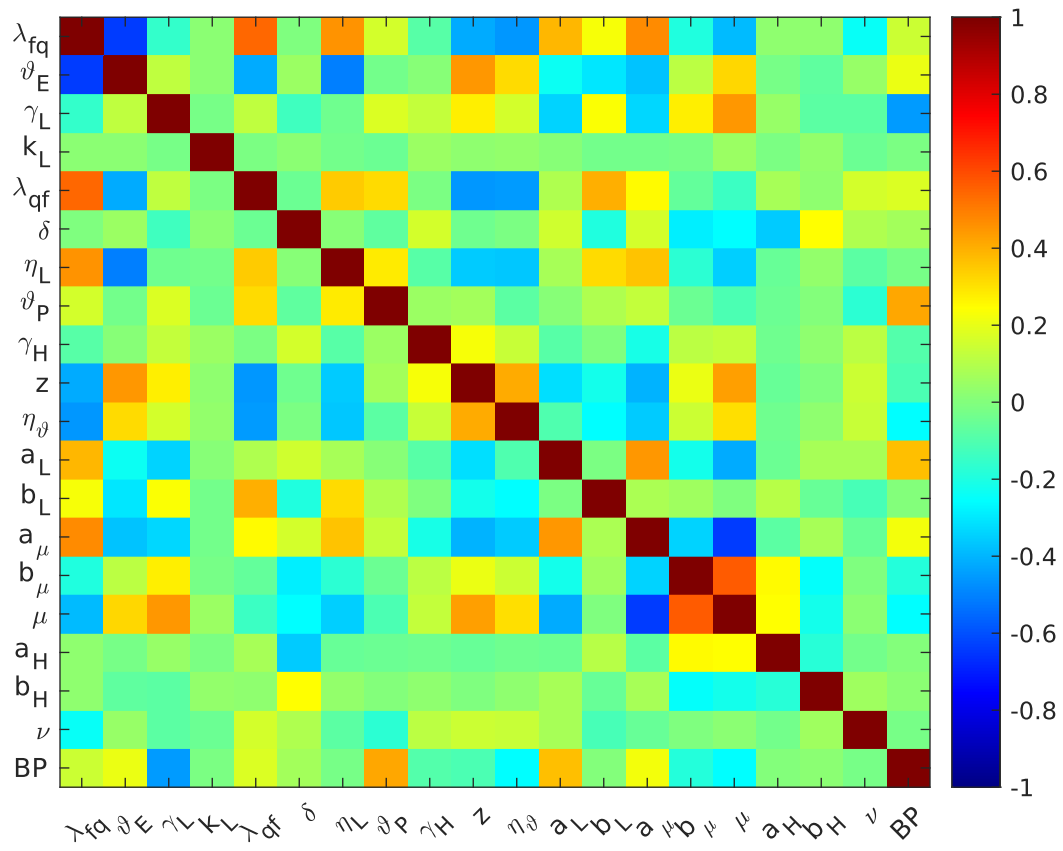
### 12.2. Estimated parameters with their intervals

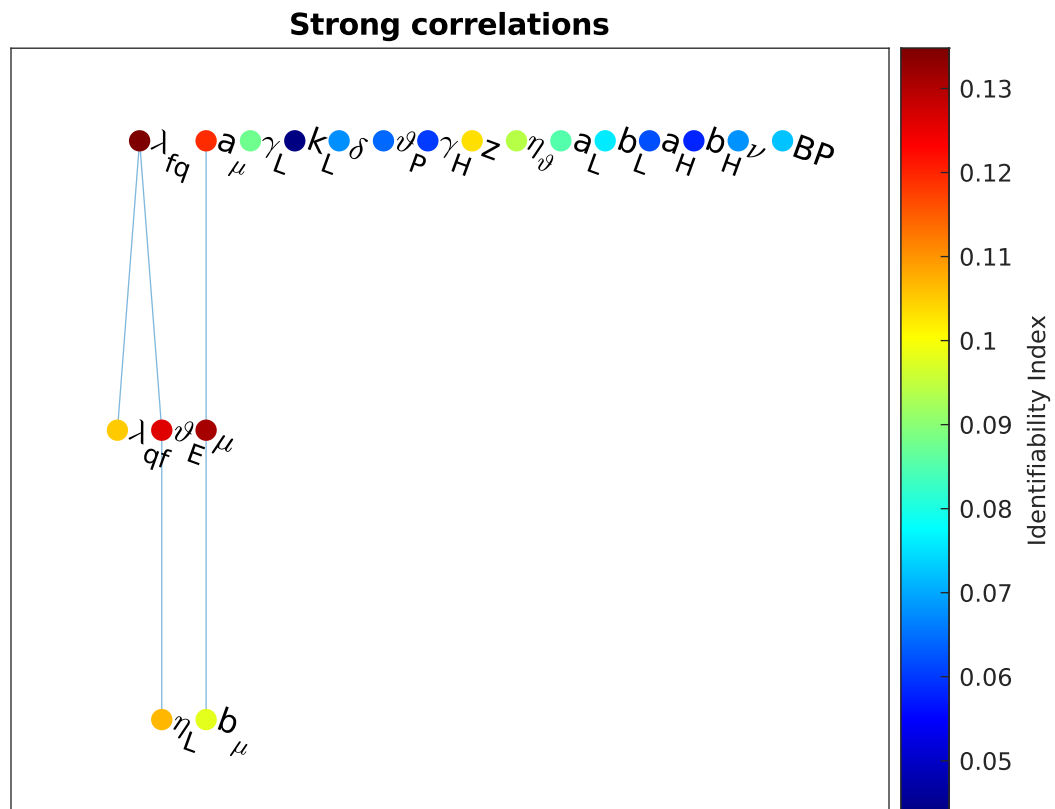
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3318'	'0.3754'	'0.3536'	'0.0007'	'0.1348'
\vartheta_E	'0.6747'	'0.7217'	'0.6982'	'0.9184'	'0.1262'
\gamma_L	'0.5895'	'0.625'	'0.6073'	'0.9991'	'0.0878'
k_L	'5.3973'	'5.625'	'5.5111'	'4.5338'	'0.0439'
\lambda_{qf}	'0.553'	'0.5859'	'0.5695'	'0.6487'	'0.105'
\delta	'0.0724'	'0.0766'	'0.0745'	'0.0422'	'0.0679'
\eta_L	'0.4488'	'0.4895'	'0.4692'	'0.7091'	'0.107'
\vartheta_P	'0.1396'	'0.1612'	'0.1504'	'0.4394'	'0.0644'
\gamma_H	'0.4759'	'0.5031'	'0.4895'	'0.395'	'0.0604'
z	'17.0654'	'18.3132'	'17.6893'	'29.4573'	'0.1034'
\eta_{\vartheta}	'0.7077'	'0.7454'	'0.7266'	'0.9715'	'0.094'
a_L	'5.0142'	'5.4903'	'5.2522'	'1.0104'	'0.0852'
b_L	'6.5219'	'7.0138'	'6.7678'	'11.7266'	'0.0762'
a_{\mu}	'4.1269'	'4.6682'	'4.3975'	'1.4503'	'0.1194'
b_{\mu}	'9.2287'	'9.7073'	'9.468'	'13.1514'	'0.098'
\mu	'0.6476'	'0.6778'	'0.6627'	'0.9791'	'0.1311'
a_H	'8.1789'	'8.6274'	'8.4032'	'9.5786'	'0.0621'
b_H	'7.3002'	'7.7153'	'7.5078'	'6.1535'	'0.0584'
\nu	'250.4088'	'273.0354'	'261.7221'	'261.8594'	'0.0682'
BP	'465.3946'	'465.6054'	'465.5'	'465.5'	'0.0724'

### 12.3. Identifiability analysis

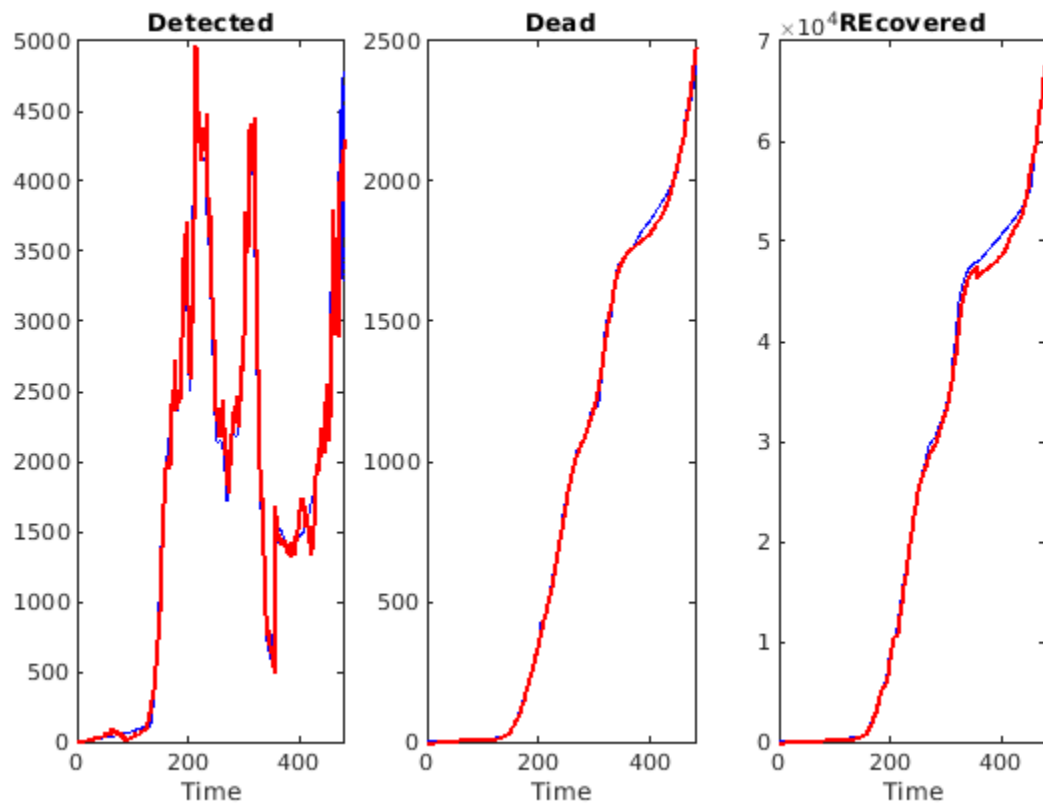






## 12.4. Uncertainty analysis

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 data480 to the 495. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

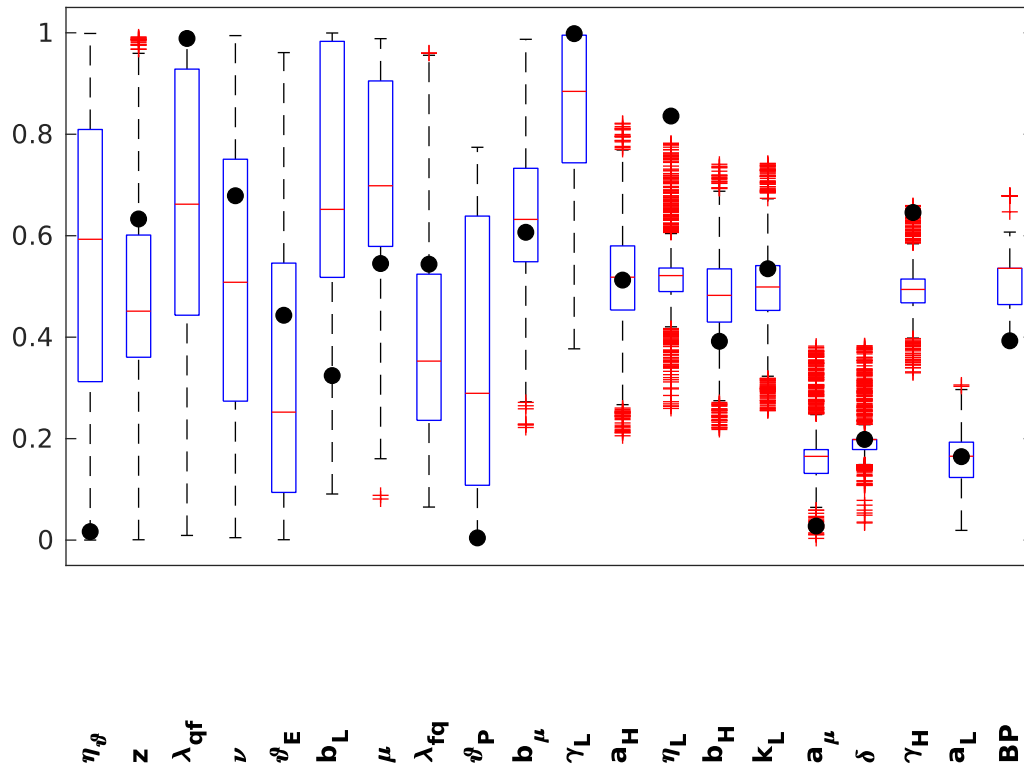
### 13.2. Estimated parameters with their intervals

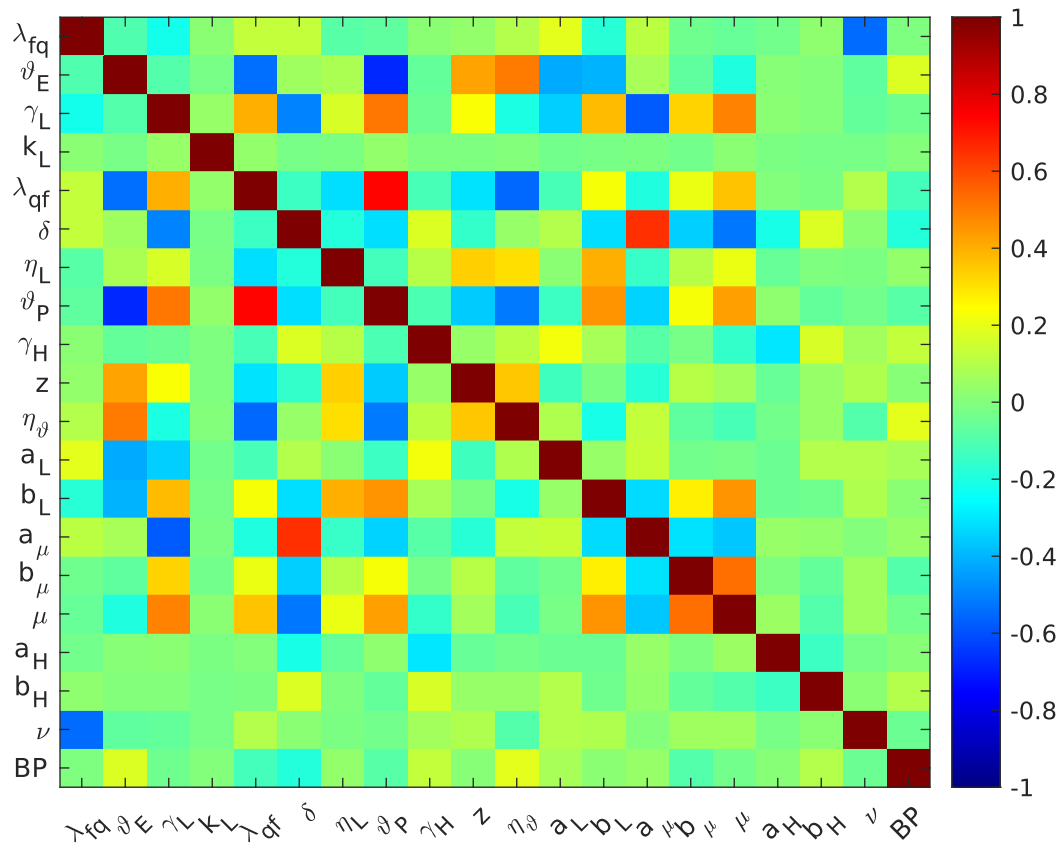
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

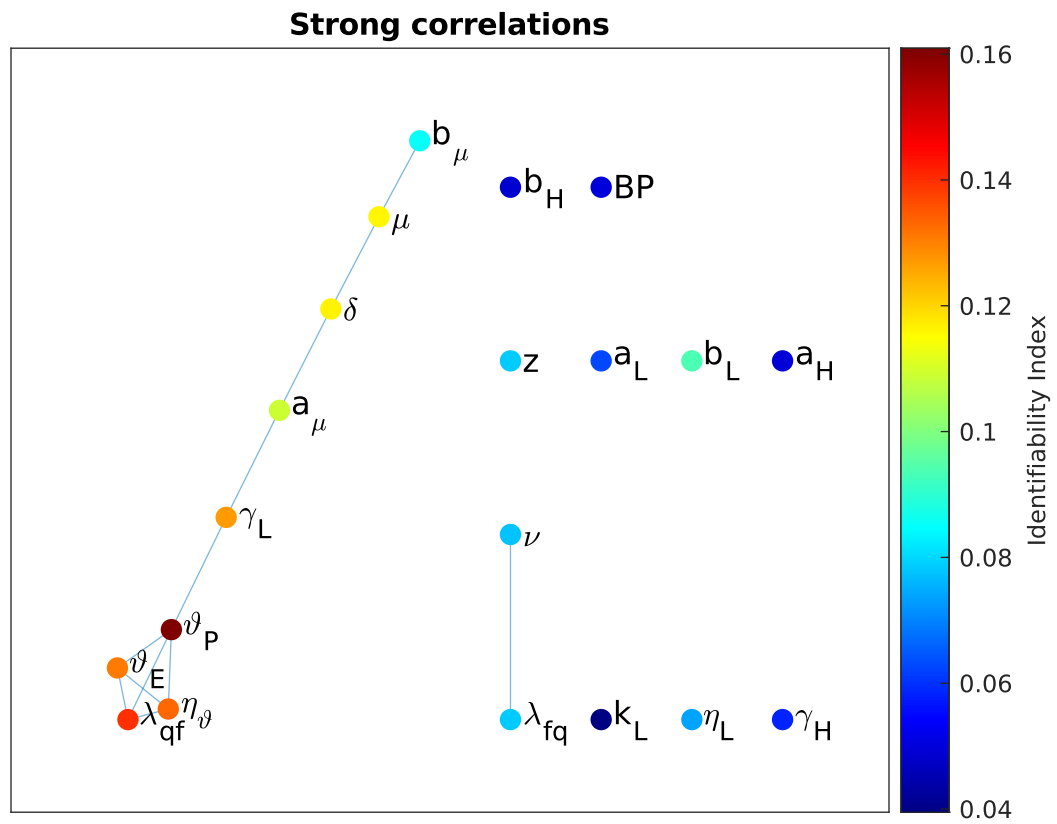
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3376'	'0.3684'	'0.353'	'0.5439'	'0.0787'
$\vartheta_E$	'0.2336'	'0.2709'	'0.2522'	'0.4432'	'0.1306'
$\gamma_L$	'0.8655'	'0.9031'	'0.8843'	'0.9983'	'0.127'
$k_L$	'5.3996'	'5.5813'	'5.4904'	'5.8138'	'0.0395'
$\lambda_{qf}$	'0.6424'	'0.6818'	'0.6621'	'0.9888'	'0.1398'
$\delta$	'0.0277'	'0.0318'	'0.0297'	'0.0298'	'0.1166'
$\eta_L$	'0.5063'	'0.5364'	'0.5214'	'0.8359'	'0.0737'
$\vartheta_P$	'0.2687'	'0.31'	'0.2894'	'0.0043'	'0.1609'
$\gamma_H$	'0.485'	'0.5032'	'0.4941'	'0.6458'	'0.0589'
$z$	'13.0453'	'14.034'	'13.5397'	'18.99'	'0.0784'
$\eta_{\vartheta}$	'0.5675'	'0.6184'	'0.593'	'0.0167'	'0.1334'
$a_L$	'3.1867'	'3.4426'	'3.3147'	'3.3025'	'0.0632'
$b_L$	'9.8527'	'10.4011'	'10.1269'	'5.54'	'0.094'
$a_{\mu}$	'3.1419'	'3.4809'	'3.3114'	'1.3875'	'0.1089'
$b_{\mu}$	'9.6792'	'10.0199'	'9.8496'	'9.4945'	'0.086'
$\mu$	'0.6846'	'0.7123'	'0.6985'	'0.5452'	'0.1161'
$a_H$	'8.1005'	'8.4105'	'8.2555'	'8.1753'	'0.0497'
$b_H$	'7.6185'	'7.8891'	'7.7538'	'6.4866'	'0.0488'
$\nu$	'243.1748'	'265.053'	'254.1139'	'339.3936'	'0.0779'
BP	'478.394'	'478.606'	'478.5'	'476.4999'	'0.05'



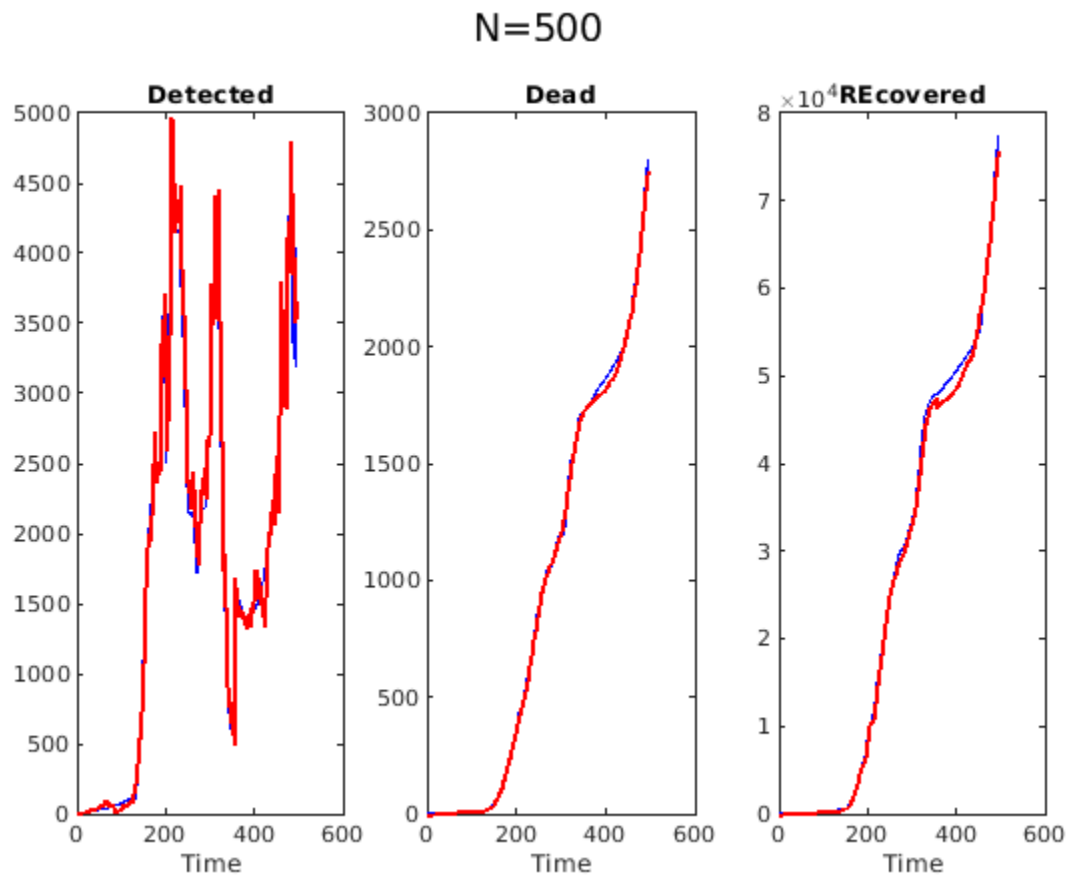
### 13.3. Identifiability analysis







### 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 data495 to the 516. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

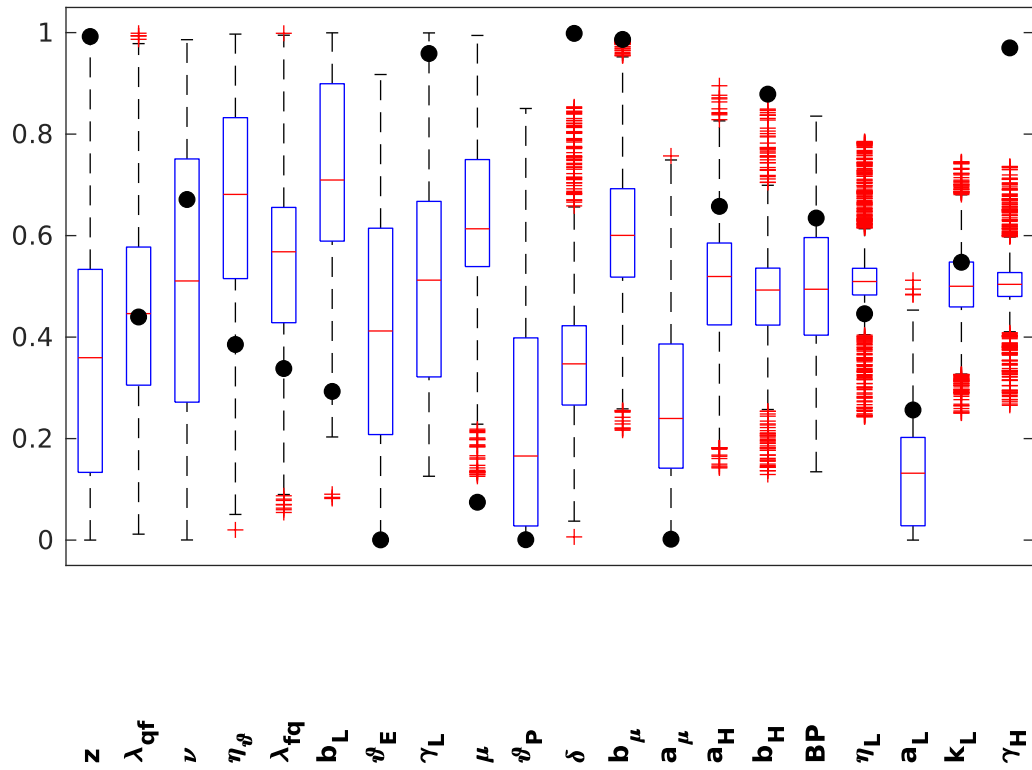
### 14.2. Estimated parameters with their intervals

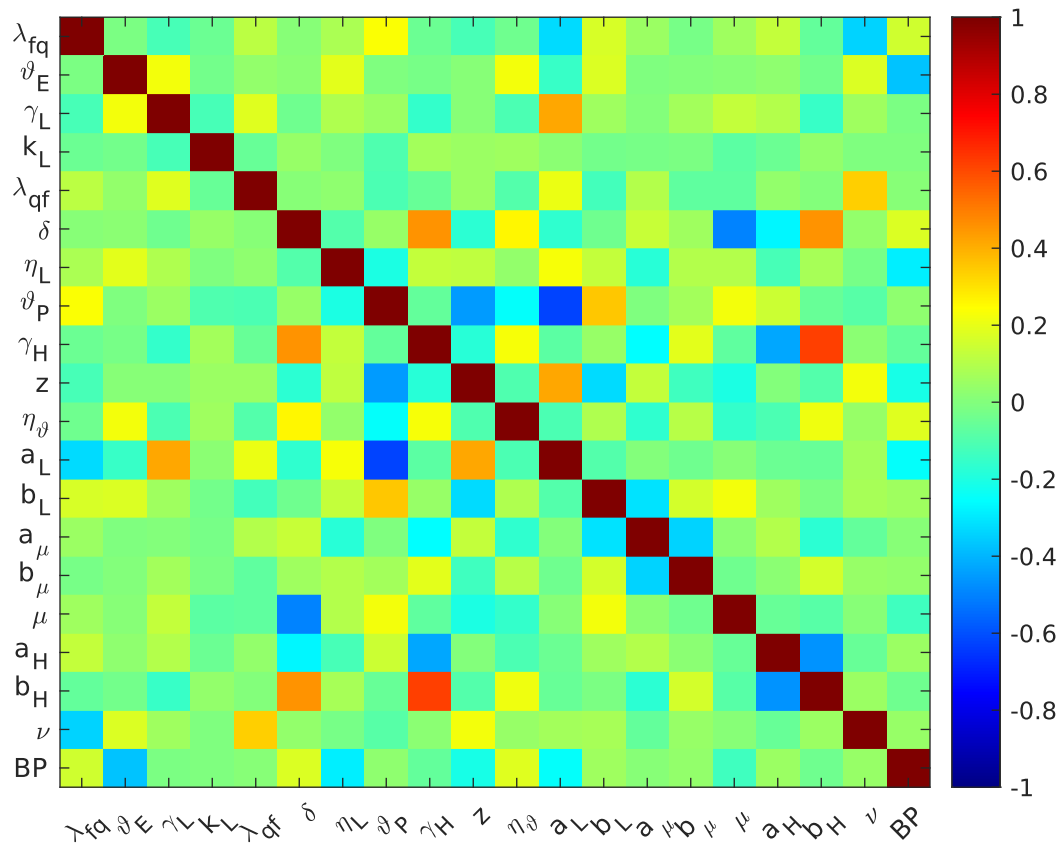
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

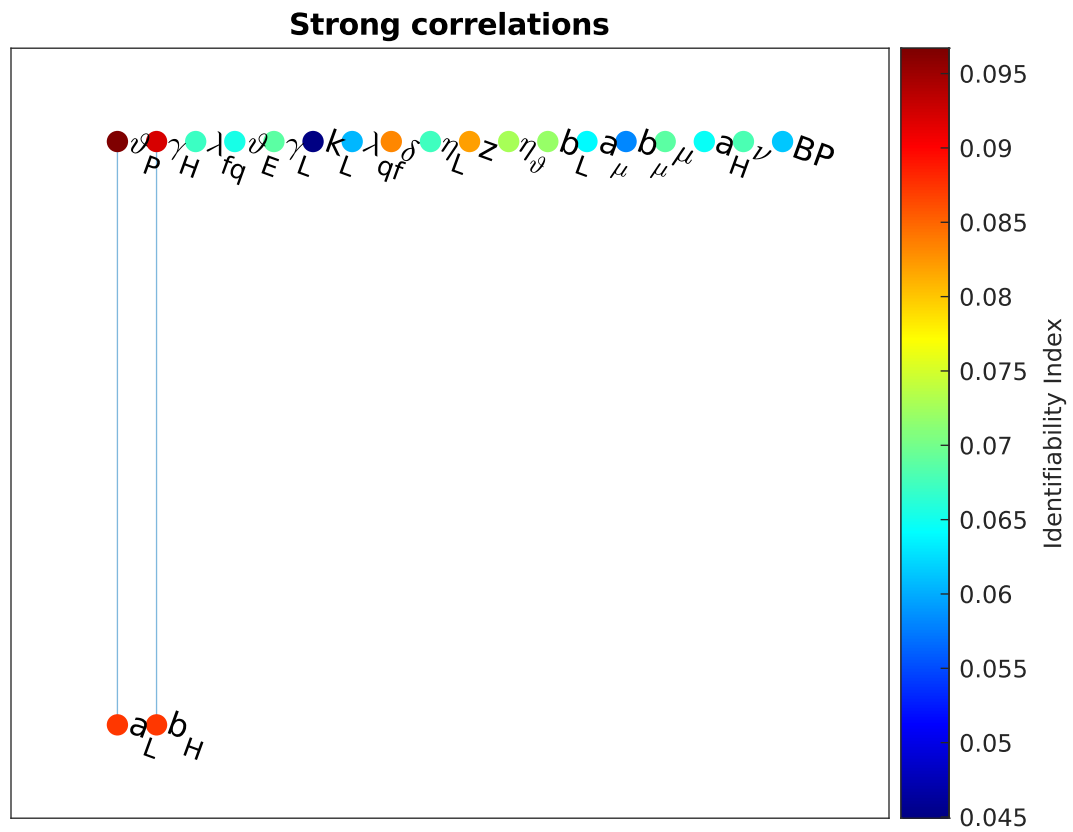
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.2361'	'0.9401'	'0.5681'	'0.3381'	'0.0673'
$\vartheta_E$	'0'	'0.001'	'0.4121'	'0.0005'	'0.0655'
$\gamma_L$	'0.3348'	'0.9661'	'0.5122'	'0.9588'	'0.0688'
$k_L$	'1'	'10'	'5.5016'	'5.9271'	'0.0449'
$\lambda_{qf}$	'0'	'0.5384'	'0.4463'	'0.4396'	'0.0606'
$\delta$	'0.0379'	'0.15'	'0.0521'	'0.1498'	'0.0833'
$\eta_L$	'0'	'1'	'0.5095'	'0.4461'	'0.0674'
$\vartheta_P$	'0.0001'	'0.0018'	'0.1657'	'0.0008'	'0.0967'
$\gamma_H$	'0.1'	'1'	'0.504'	'0.9699'	'0.0922'
$z$	'0'	'30'	'10.7827'	'29.769'	'0.0821'
$\eta_{\vartheta}$	'0.2606'	'0.5066'	'0.6812'	'0.3854'	'0.0728'
$a_L$	'3.8527'	'5.7035'	'2.8453'	'4.5901'	'0.0872'
$b_L$	'4.8961'	'10.2396'	'10.9335'	'5.1017'	'0.0719'
$a_{\mu}$	'1'	'15'	'4.3553'	'1.0245'	'0.064'
$b_{\mu}$	'1'	'15'	'9.4061'	'14.8121'	'0.0581'
$\mu$	'0'	'0.1679'	'0.6134'	'0.0746'	'0.0688'
$a_H$	'2.98'	'15'	'8.2718'	'10.2063'	'0.0647'
$b_H$	'1.5544'	'15'	'7.8983'	'13.3027'	'0.0873'
$\nu$	'217.2834'	'488.6913'	'255.3196'	'335.5728'	'0.0682'
BP	'496.1591'	'501.5023'	'492.8518'	'496.5'	'0.0614'

## 14.3. Identifiability analysis



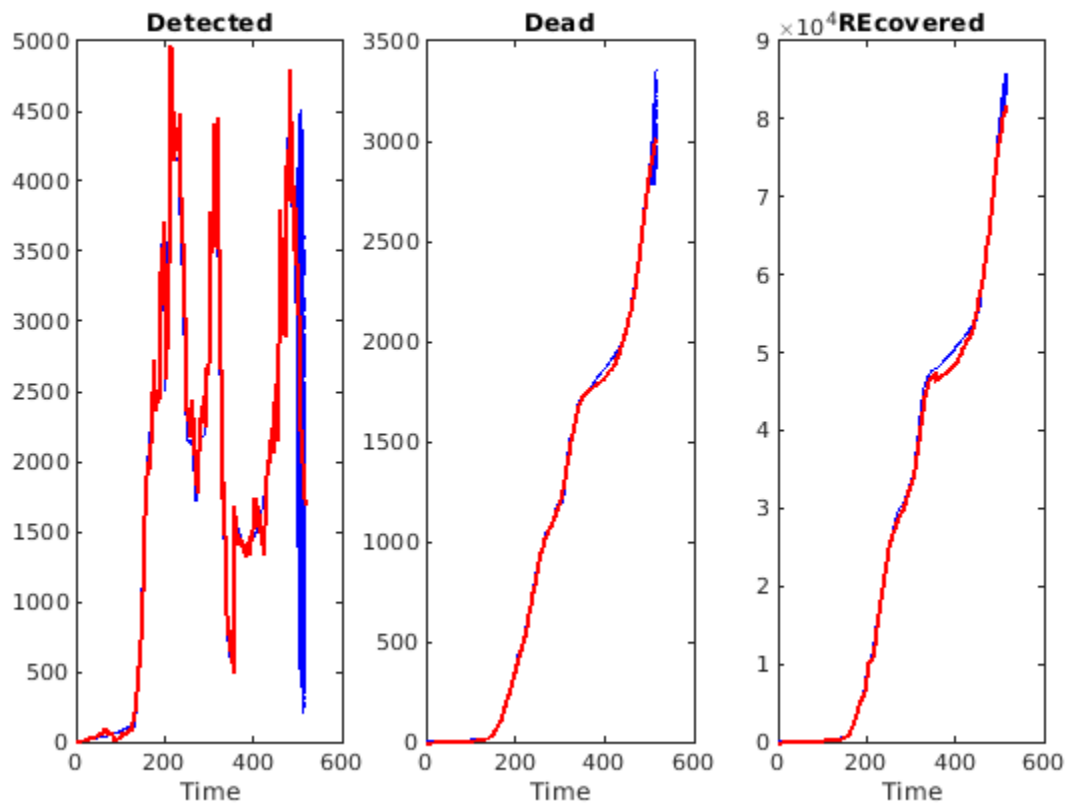






## 14.4. Uncertainty analysis

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 data516 to the 540. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

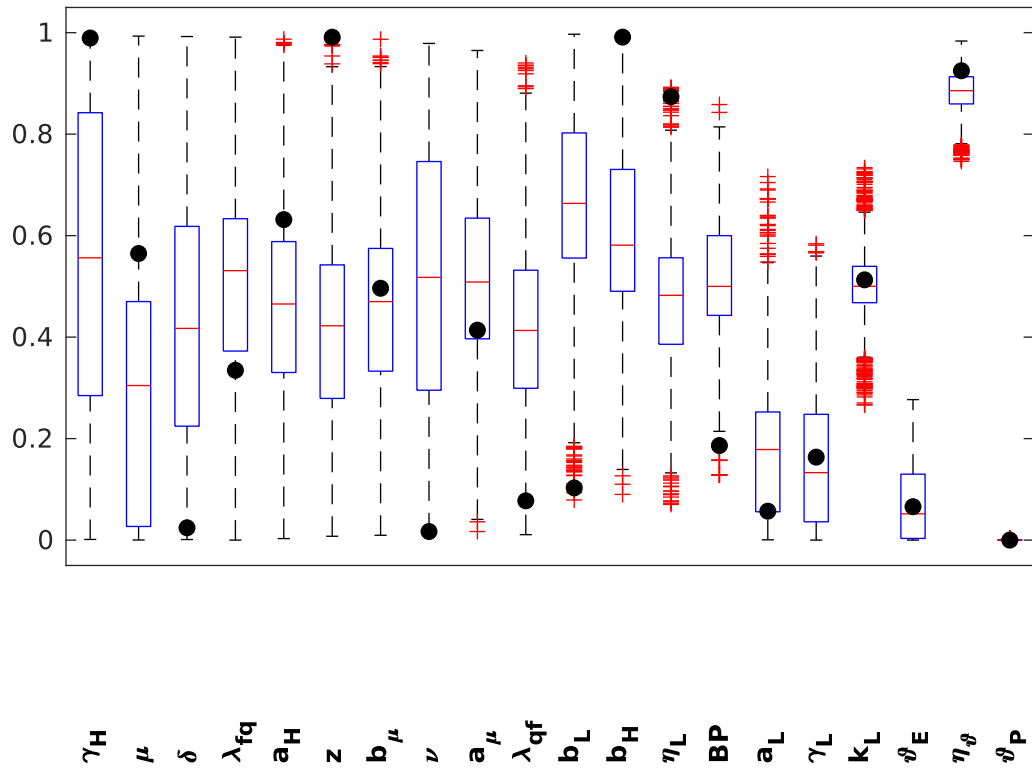
### 15.2. Estimated parameters with their intervals

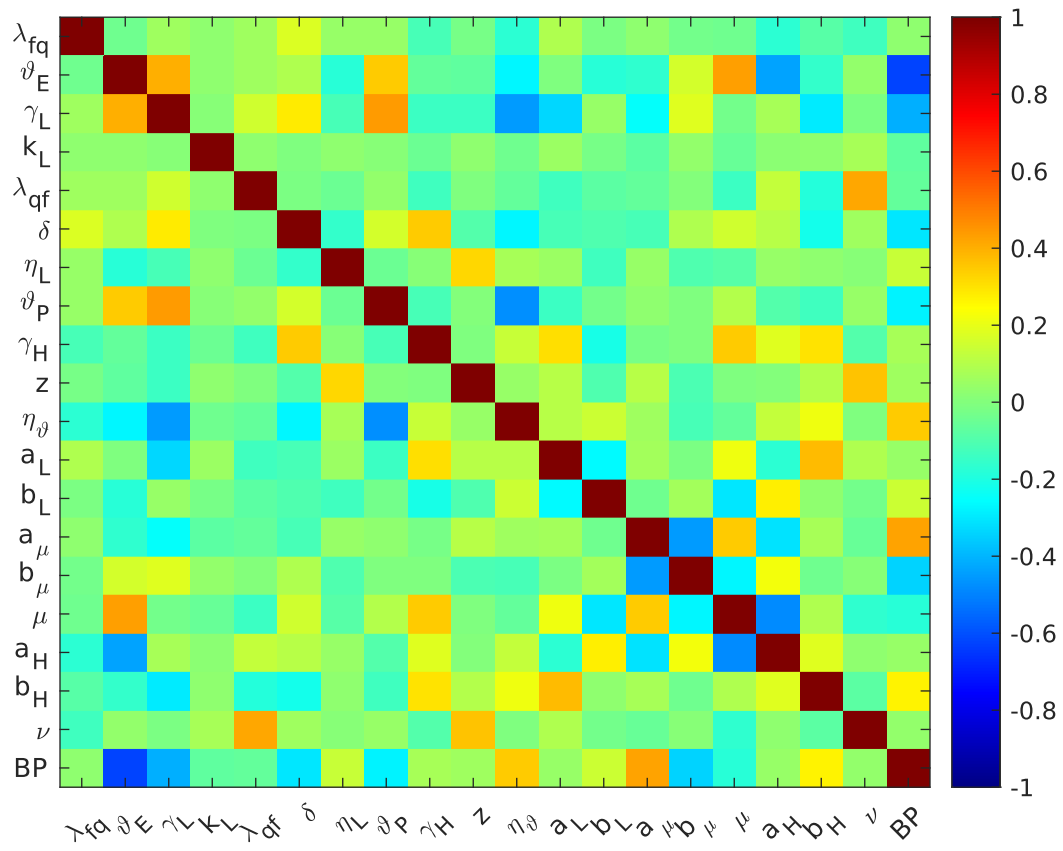
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

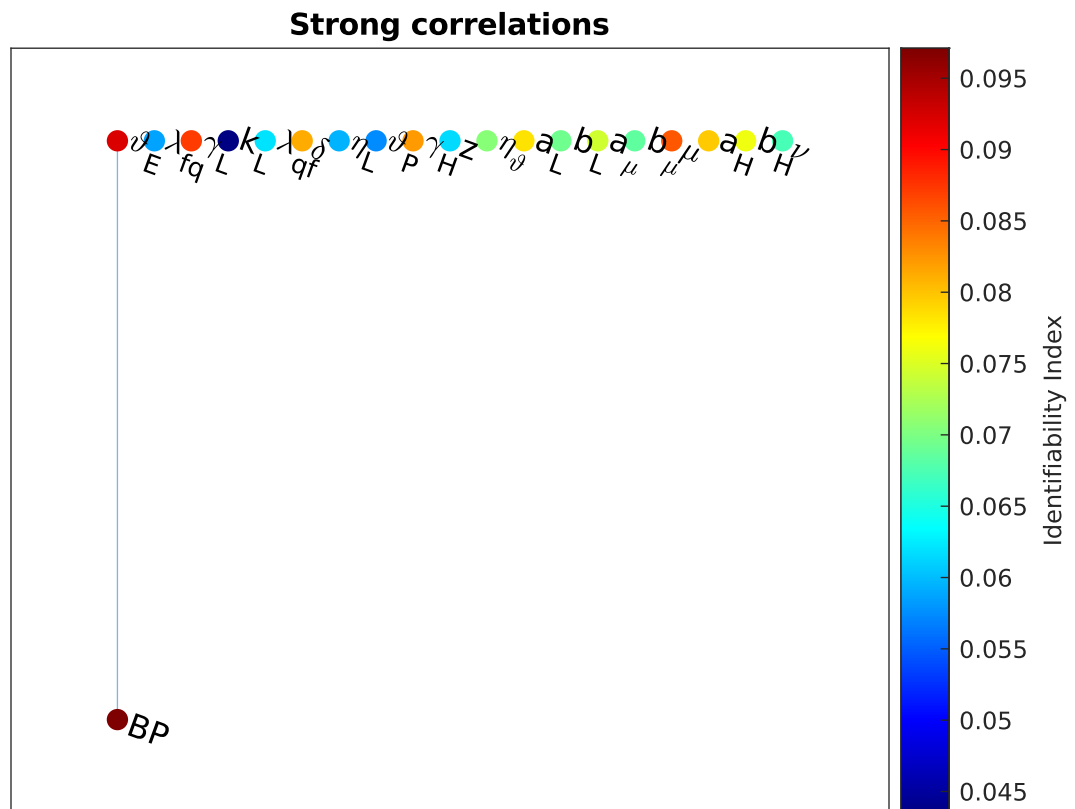
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3126'	'0.3918'	'0.531'	'0.3347'	'0.0587'
$\vartheta_E$	'0.058'	'0.0926'	'0.0517'	'0.0658'	'0.0922'
$\gamma_L$	'0.1127'	'0.1637'	'0.1329'	'0.1635'	'0.0872'
$k_L$	'1.1465'	'7.6939'	'5.5015'	'5.6159'	'0.0435'
$\lambda_{qf}$	'0.0629'	'0.0867'	'0.4131'	'0.0774'	'0.062'
$\delta$	'0.0002'	'0.0079'	'0.0626'	'0.0036'	'0.0813'
$\eta_L$	'0.5424'	'0.9617'	'0.4824'	'0.8738'	'0.0596'
$\vartheta_P$	'0'	'0'	'0.0005'	'0'	'0.0575'
$\gamma_H$	'0.0684'	'1'	'0.5563'	'0.9894'	'0.0821'
$z$	'19.6575'	'30'	'12.6689'	'29.7307'	'0.0617'
$\eta_{\vartheta}$	'0.5359'	'0.9698'	'0.8856'	'0.9249'	'0.0707'
$a_L$	'1.3238'	'3.0336'	'3.4988'	'1.7977'	'0.0784'
$b_L$	'2.3661'	'6.7256'	'10.2896'	'2.4394'	'0.0695'
$a_{\mu}$	'4.8398'	'13.6033'	'8.1197'	'6.7927'	'0.0744'
$b_{\mu}$	'1.9868'	'12.34'	'7.5793'	'7.948'	'0.0686'
$\mu$	'0.0369'	'0.9216'	'0.3046'	'0.5648'	'0.0857'
$a_H$	'3.642'	'15'	'7.5141'	'9.8424'	'0.0797'
$b_H$	'4.1091'	'15'	'9.1369'	'14.8765'	'0.0761'
$\nu$	'7.9008'	'13.9663'	'258.8745'	'8.4486'	'0.0672'
BP	'500.8867'	'510.1569'	'512.5'	'501.5214'	'0.0971'

### 15.3. Identifiability analysis

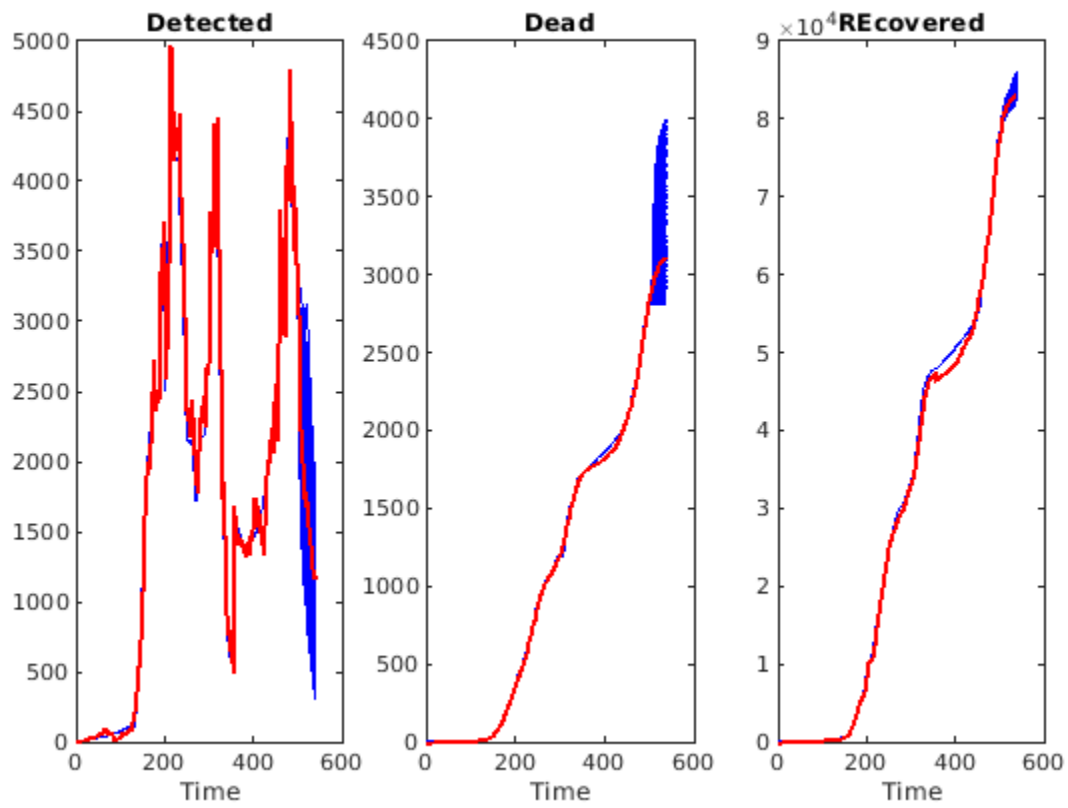






## 15.4. Uncertainty analysis

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 data540 to the 601. The status of the validation is: COMPLETED.

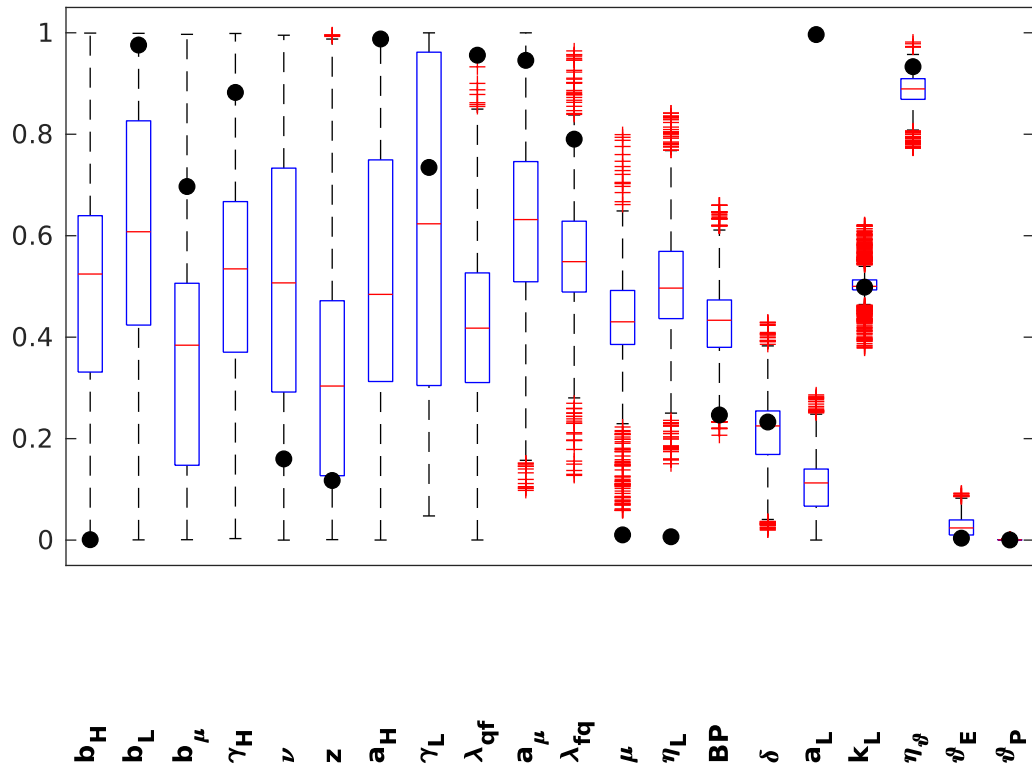
The number of estimations needed to perform the validation was1000.

### 16.2. Estimated parameters with their intervals

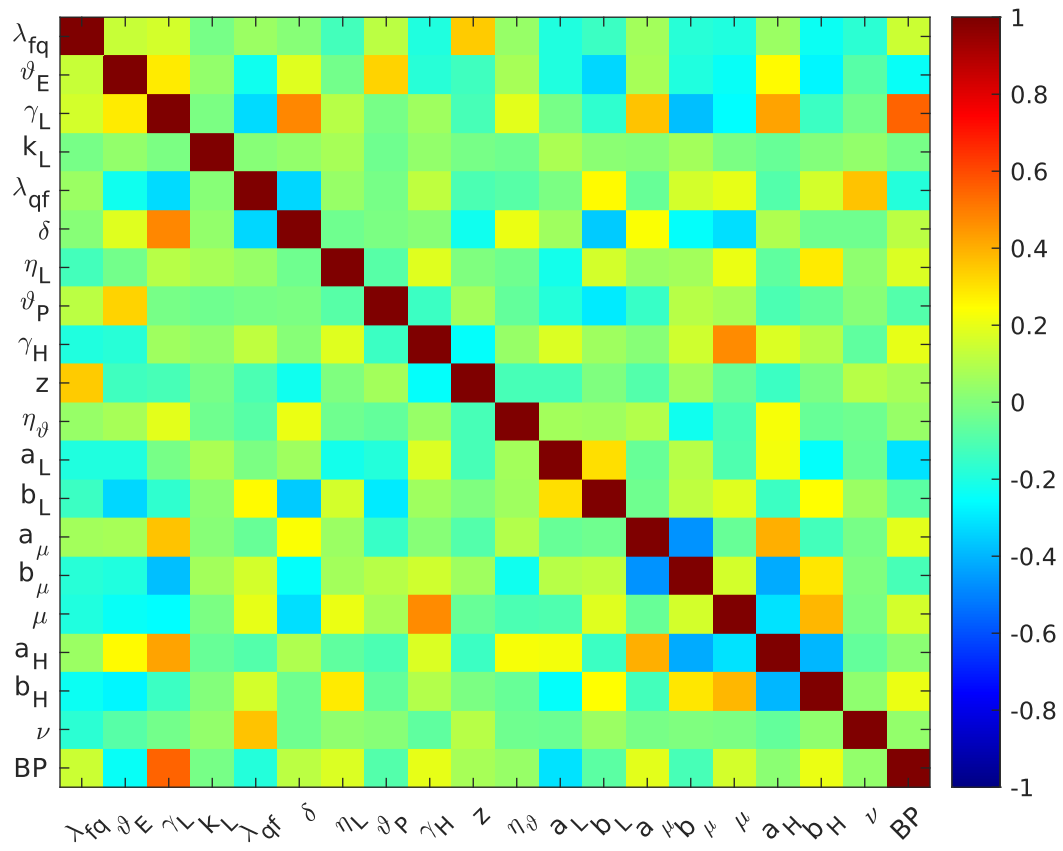
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

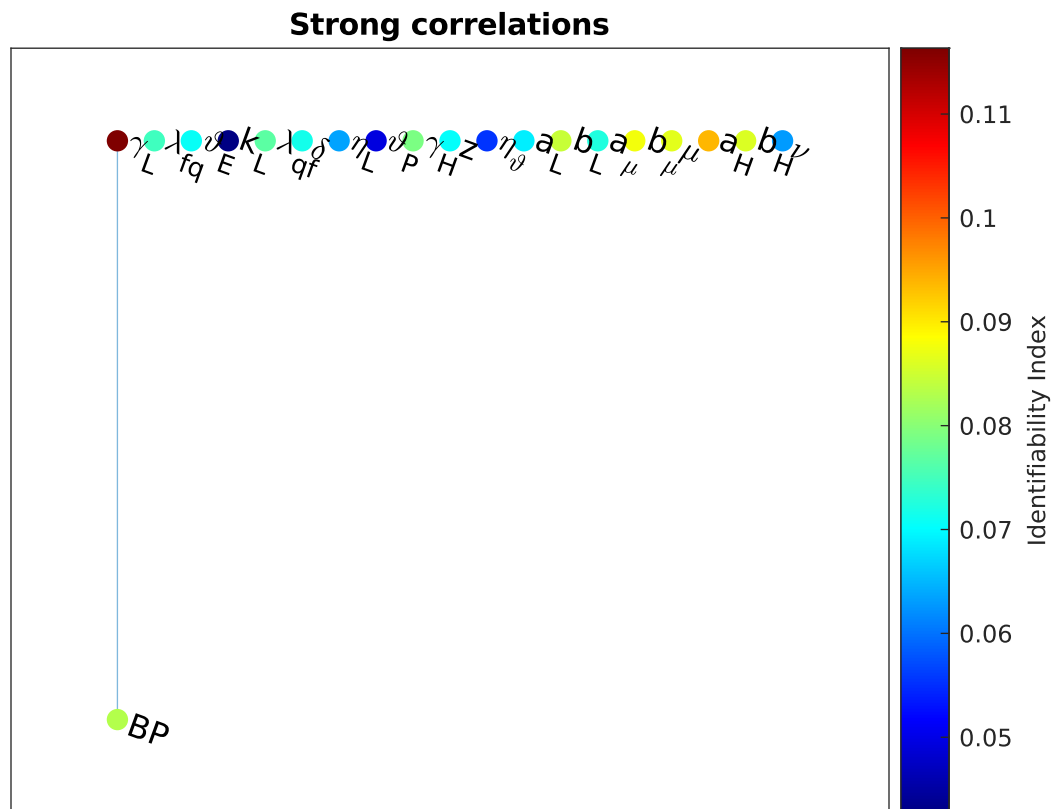
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.5308'	'0.5669'	'0.5488'	'0.7903'	'0.0747'
$\vartheta_E$	'0.0215'	'0.0264'	'0.024'	'0.0038'	'0.0708'
$\gamma_L$	'0.5952'	'0.6517'	'0.6235'	'0.7346'	'0.1163'
$k_L$	'5.4117'	'5.5917'	'5.5017'	'5.4873'	'0.0428'
$\lambda_{qf}$	'0.4007'	'0.4349'	'0.4178'	'0.9558'	'0.077'
$\delta$	'0.0324'	'0.0351'	'0.0338'	'0.0349'	'0.0717'
$\eta_L$	'0.4825'	'0.5109'	'0.4967'	'0.0066'	'0.0635'
$\vartheta_P$	'0.0003'	'0.0006'	'0.0004'	'0.0003'	'0.0495'
$\gamma_H$	'0.5132'	'0.556'	'0.5346'	'0.8824'	'0.079'
$z$	'8.4954'	'9.7248'	'9.1101'	'3.5248'	'0.0706'
$\eta_{\vartheta}$	'0.8812'	'0.8976'	'0.8894'	'0.9332'	'0.0555'
$a_L$	'2.4302'	'2.7249'	'2.5776'	'14.9505'	'0.0691'
$b_L$	'9.1964'	'9.8221'	'9.5092'	'14.6616'	'0.0845'
$a_{\mu}$	'9.6214'	'10.0688'	'9.8451'	'14.2389'	'0.0727'
$b_{\mu}$	'6.114'	'6.6429'	'6.3785'	'10.7574'	'0.0878'
$\mu$	'0.4122'	'0.4484'	'0.4303'	'0.0103'	'0.0867'
$a_H$	'7.4521'	'8.1095'	'7.7808'	'14.829'	'0.0939'
$b_H$	'8.0572'	'8.6277'	'8.3424'	'1.0115'	'0.0861'
$\nu$	'241.9042'	'265.1036'	'253.5039'	'80.019'	'0.0631'
BP	'547.814'	'549.1859'	'548.5'	'534.5'	'0.0832'

### 16.3. Identifiability analysis



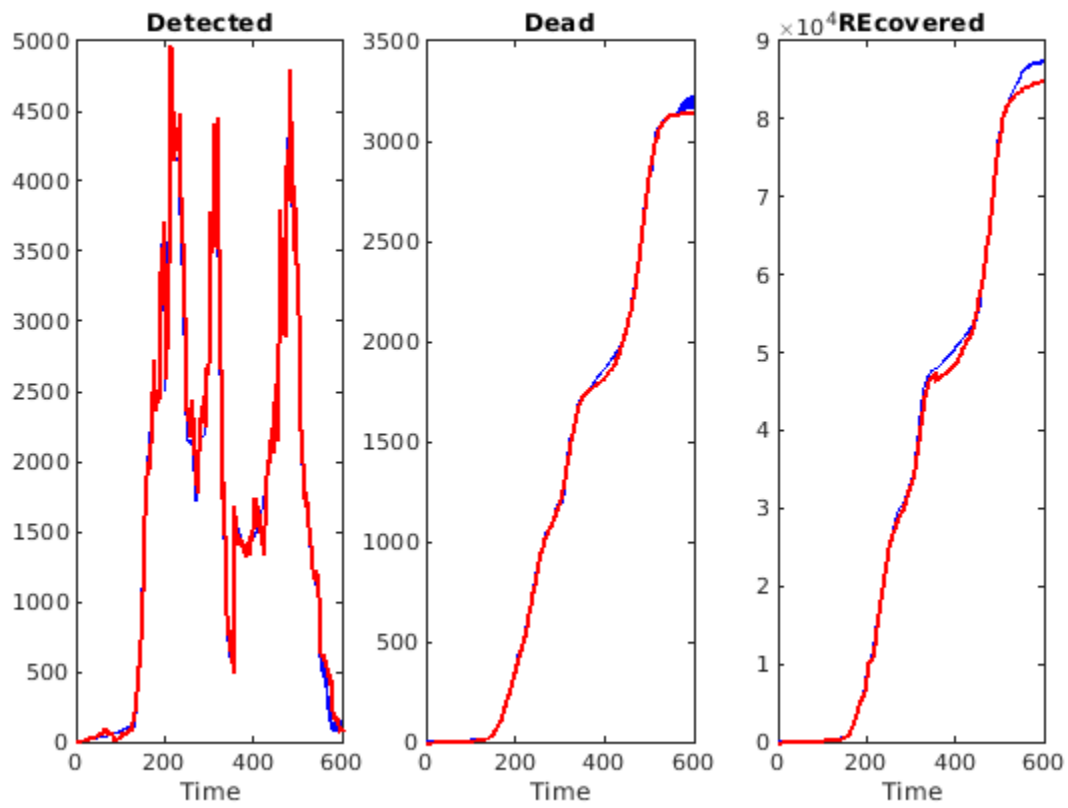






## 16.4. Uncertainty analysis

N=500



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## Chapter 17. Extension number17

### 17.1. Basic information

The extension to be validated consists of the time series from the data601 to the 722. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

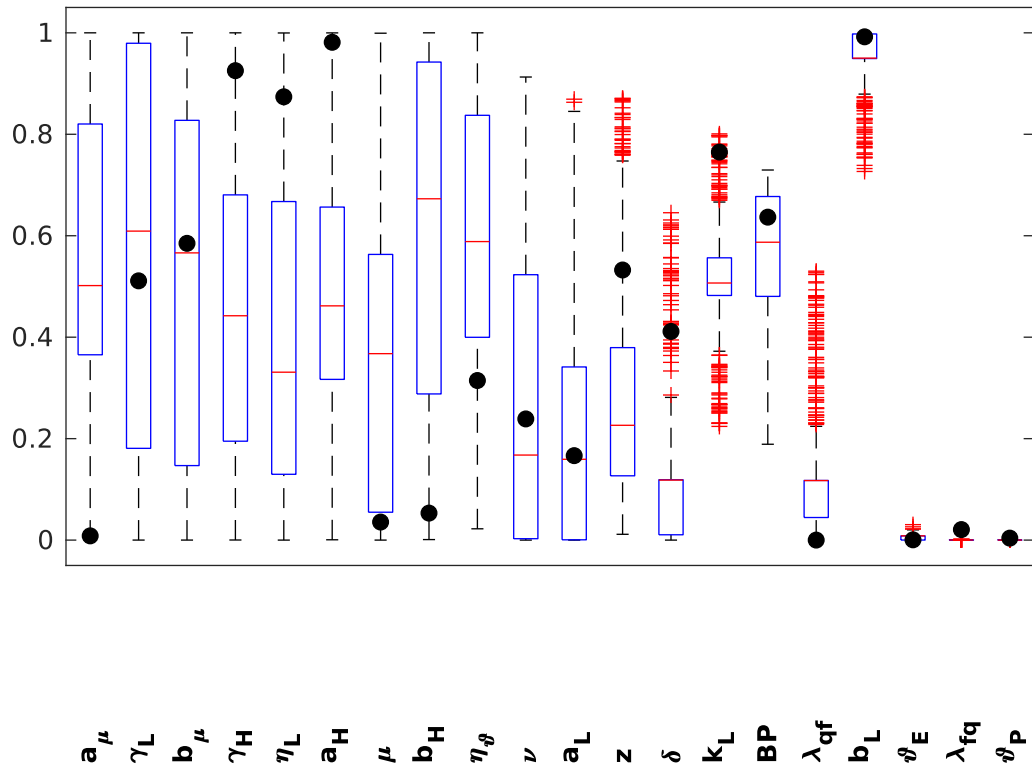
### 17.2. Estimated parameters with their intervals

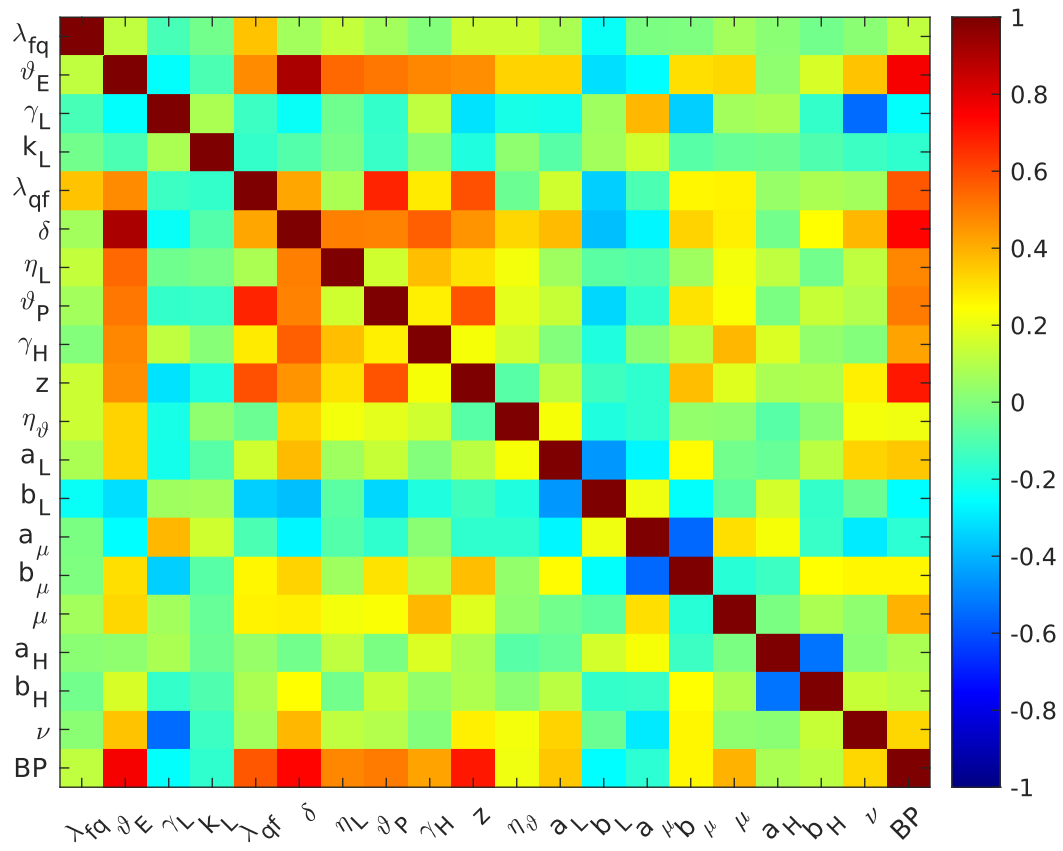
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

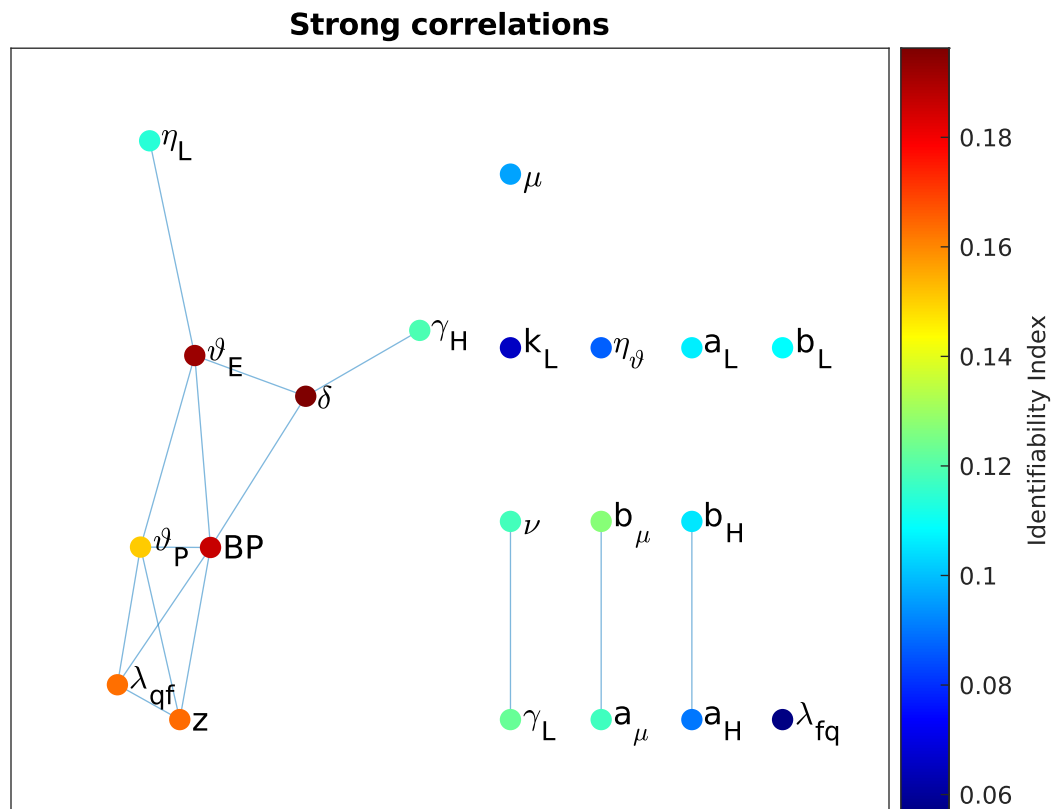
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0149'	'0.0213'	'0.0003'	'0.0207'	'0.0568'
$\vartheta_E$	'0'	'0.0011'	'0.0083'	'0.0006'	'0.192'
$\gamma_L$	'0.419'	'0.9081'	'0.6091'	'0.5111'	'0.1227'
$k_L$	'1.225'	'9.5613'	'5.5613'	'7.8844'	'0.0656'
$\lambda_{qf}$	'0'	'0.0001'	'0.1176'	'0'	'0.1631'
$\delta$	'0.0282'	'0.1152'	'0.0179'	'0.0617'	'0.1963'
$\eta_L$	'0.02'	'1'	'0.331'	'0.8739'	'0.1141'
$\vartheta_P$	'0.0022'	'0.0557'	'0.0001'	'0.0039'	'0.1506'
$\gamma_H$	'0.02'	'0.951'	'0.4423'	'0.9254'	'0.119'
$z$	'15.1684'	'19.7019'	'6.795'	'15.9738'	'0.1638'
$\eta_{\vartheta}$	'0'	'0.3272'	'0.5885'	'0.3146'	'0.0873'
$a_L$	'2.2947'	'3.4489'	'3.2436'	'3.3308'	'0.1066'
$b_L$	'8.3101'	'15'	'14.2903'	'14.8901'	'0.1087'
$a_{\mu}$	'1'	'14.44'	'8.0242'	'1.1167'	'0.1173'
$b_{\mu}$	'1.3192'	'13.27'	'8.9269'	'9.19'	'0.1272'
$\mu$	'0.0015'	'0.0731'	'0.3675'	'0.0356'	'0.0961'
$a_H$	'2.899'	'15'	'7.4649'	'14.7387'	'0.0905'
$b_H$	'1'	'14.44'	'10.4199'	'1.7452'	'0.1056'
$\nu$	'118.2784'	'174.8357'	'83.8551'	'119.4334'	'0.1183'
BP	'648.5753'	'652.3508'	'640.9999'	'649.5'	'0.1864'

### 17.3. Identifiability analysis







## 17.4. Uncertainty analysis

N=500

