

# **Validation process forVALLE**

**The epidemiology research group, EAFIT**

06-Apr-2022

# Table of Contents

<a href="#">Chapter 1. Extension number1</a>	1
<a href="#">1.1. Basic information</a>	1
<a href="#">1.2. Estimated parameters with their intervals</a>	1
<a href="#">1.3. Identifiability analysis</a>	2
<a href="#">1.4. Uncertainty analysis</a>	5
<a href="#">Chapter 2. Extension number2</a>	6
<a href="#">2.1. Basic information</a>	6
<a href="#">2.2. Estimated parameters with their intervals</a>	6
<a href="#">2.3. Identifiability analysis</a>	7
<a href="#">2.4. Uncertainty analysis</a>	10
<a href="#">Chapter 3. Extension number3</a>	11
<a href="#">3.1. Basic information</a>	11
<a href="#">3.2. Estimated parameters with their intervals</a>	11
<a href="#">3.3. Identifiability analysis</a>	12
<a href="#">3.4. Uncertainty analysis</a>	15
<a href="#">Chapter 4. Extension number4</a>	16
<a href="#">4.1. Basic information</a>	16
<a href="#">4.2. Estimated parameters with their intervals</a>	16
<a href="#">4.3. Identifiability analysis</a>	17
<a href="#">4.4. Uncertainty analysis</a>	20
<a href="#">Chapter 5. Extension number5</a>	21
<a href="#">5.1. Basic information</a>	21
<a href="#">5.2. Estimated parameters with their intervals</a>	21
<a href="#">5.3. Identifiability analysis</a>	22
<a href="#">5.4. Uncertainty analysis</a>	25
<a href="#">Chapter 6. Extension number6</a>	26
<a href="#">6.1. Basic information</a>	26
<a href="#">6.2. Estimated parameters with their intervals</a>	26
<a href="#">6.3. Identifiability analysis</a>	27
<a href="#">6.4. Uncertainty analysis</a>	30
<a href="#">Chapter 7. Extension number7</a>	31
<a href="#">7.1. Basic information</a>	31
<a href="#">7.2. Estimated parameters with their intervals</a>	31
<a href="#">7.3. Identifiability analysis</a>	32
<a href="#">7.4. Uncertainty analysis</a>	35
<a href="#">Chapter 8. Extension number8</a>	36
<a href="#">8.1. Basic information</a>	36
<a href="#">8.2. Estimated parameters with their intervals</a>	36
<a href="#">8.3. Identifiability analysis</a>	37
<a href="#">8.4. Uncertainty analysis</a>	40
<a href="#">Chapter 9. Extension number9</a>	41
<a href="#">9.1. Basic information</a>	41
<a href="#">9.2. Estimated parameters with their intervals</a>	41

<a href="#">9.3. Identifiability analysis</a>	42
<a href="#">9.4. Uncertainty analysis</a>	45
Chapter 10. <a href="#">Extension number10</a>	46
<a href="#">10.1. Basic information</a>	46
<a href="#">10.2. Estimated parameters with their intervals</a>	46
<a href="#">10.3. Identifiability analysis</a>	47
<a href="#">10.4. Uncertainty analysis</a>	50
Chapter 11. <a href="#">Extension number11</a>	51
<a href="#">11.1. Basic information</a>	51
<a href="#">11.2. Estimated parameters with their intervals</a>	51
<a href="#">11.3. Identifiability analysis</a>	52
<a href="#">11.4. Uncertainty analysis</a>	55
Chapter 12. <a href="#">Extension number12</a>	56
<a href="#">12.1. Basic information</a>	56
<a href="#">12.2. Estimated parameters with their intervals</a>	56
<a href="#">12.3. Identifiability analysis</a>	57
<a href="#">12.4. Uncertainty analysis</a>	60
Chapter 13. <a href="#">Extension number13</a>	61
<a href="#">13.1. Basic information</a>	61
<a href="#">13.2. Estimated parameters with their intervals</a>	61
<a href="#">13.3. Identifiability analysis</a>	62
<a href="#">13.4. Uncertainty analysis</a>	65

---

## Chapter 1. Extension number1

### 1.1. Basic information

The extension to be validated consists of the time series from the data1 to the 73. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

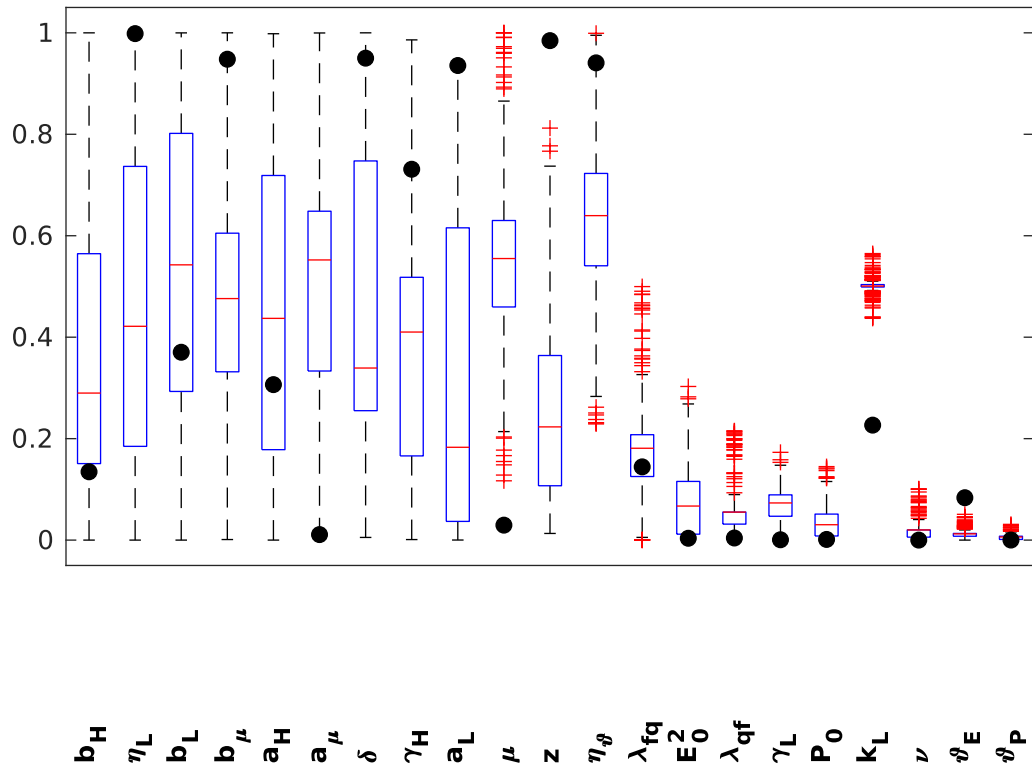
### 1.2. Estimated parameters with their intervals

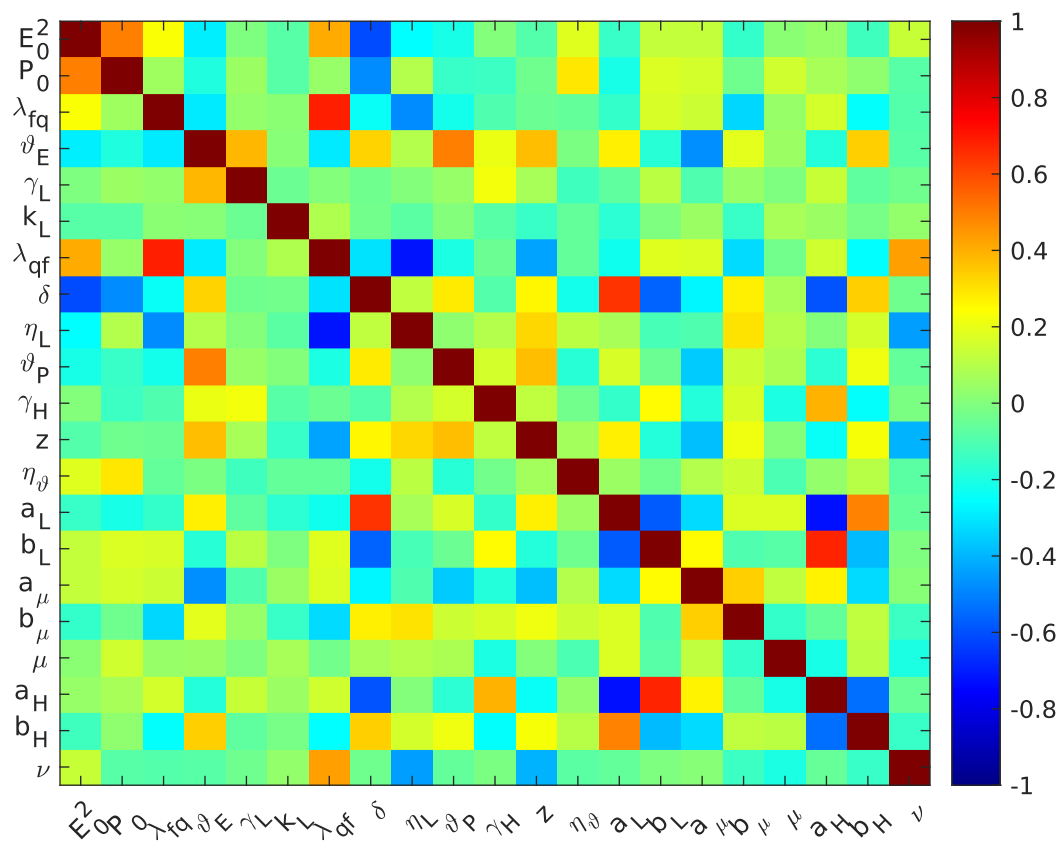
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

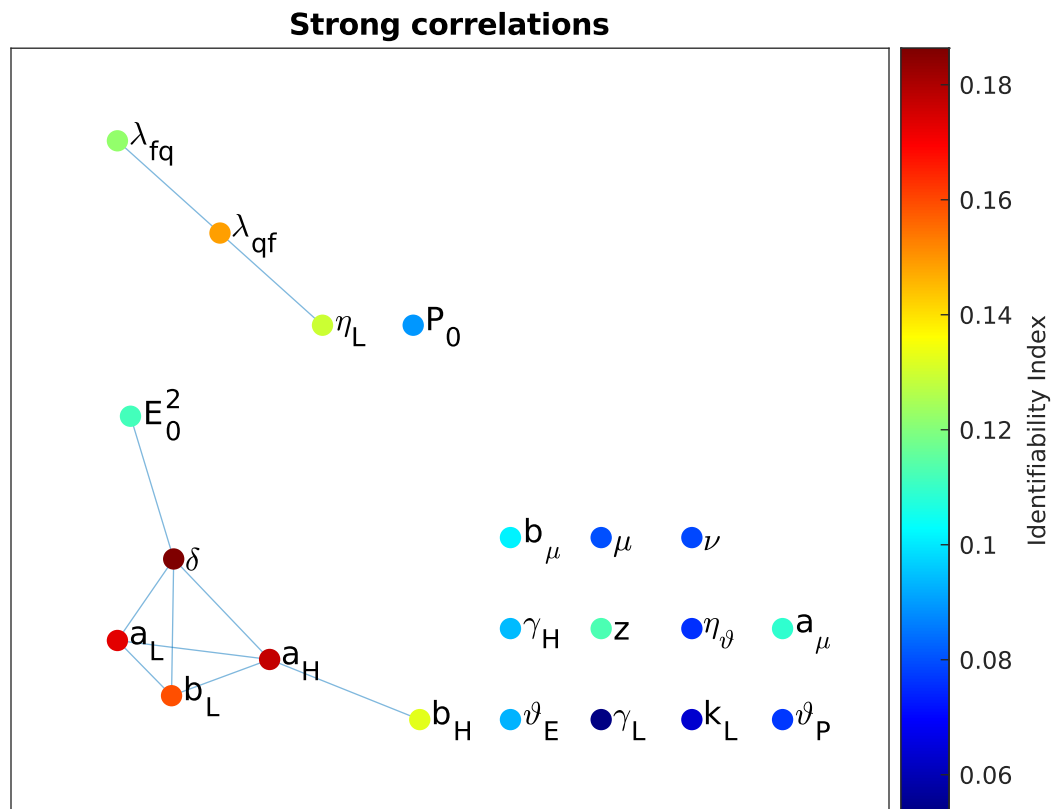
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
E^2_0	'6.8113'	'9.4265'	'134.2504'	'7.2541'	'0.1121'
P_0	'0.4957'	'0.7643'	'12.1288'	'0.5279'	'0.0893'
\lambda_{fq}	'0.142'	'0.1445'	'0.1811'	'0.1444'	'0.1225'
\vartheta_E	'0.0823'	'0.1283'	'0.0123'	'0.0836'	'0.0929'
\gamma_L	'0'	'0.0014'	'0.0732'	'0.0007'	'0.0535'
k_L	'1'	'9.55'	'5.5074'	'3.0398'	'0.0635'
\lambda_{qf}	'0.0036'	'0.0042'	'0.0552'	'0.0041'	'0.1488'
\delta	'0.1087'	'0.1429'	'0.0509'	'0.1425'	'0.1864'
\eta_L	'0.9424'	'1'	'0.4215'	'0.9984'	'0.1296'
\vartheta_P	'0'	'0.0002'	'0.0062'	'0.0001'	'0.0771'
\gamma_H	'0.3252'	'1'	'0.4101'	'0.7311'	'0.0944'
z	'28.3958'	'29.6099'	'6.6952'	'29.5382'	'0.1128'
\eta_{\vartheta}	'0.6534'	'0.9614'	'0.6396'	'0.9408'	'0.076'
a_L	'1.7'	'15'	'3.5615'	'14.0979'	'0.1732'
b_L	'1.7'	'14.335'	'8.5966'	'6.1844'	'0.1592'
a_{\mu}	'1.1301'	'1.5072'	'8.732'	'1.152'	'0.1093'
b_{\mu}	'10.3525'	'14.7498'	'7.6656'	'14.2717'	'0.1017'
\mu	'0.0234'	'0.0309'	'0.555'	'0.0295'	'0.0805'
a_H	'4.5741'	'8.1891'	'7.1195'	'5.2908'	'0.1774'
b_H	'2.6393'	'6.9075'	'5.0578'	'2.8852'	'0.1328'
\nu	'0.0009'	'0.0178'	'10.0152'	'0.0079'	'0.0793'

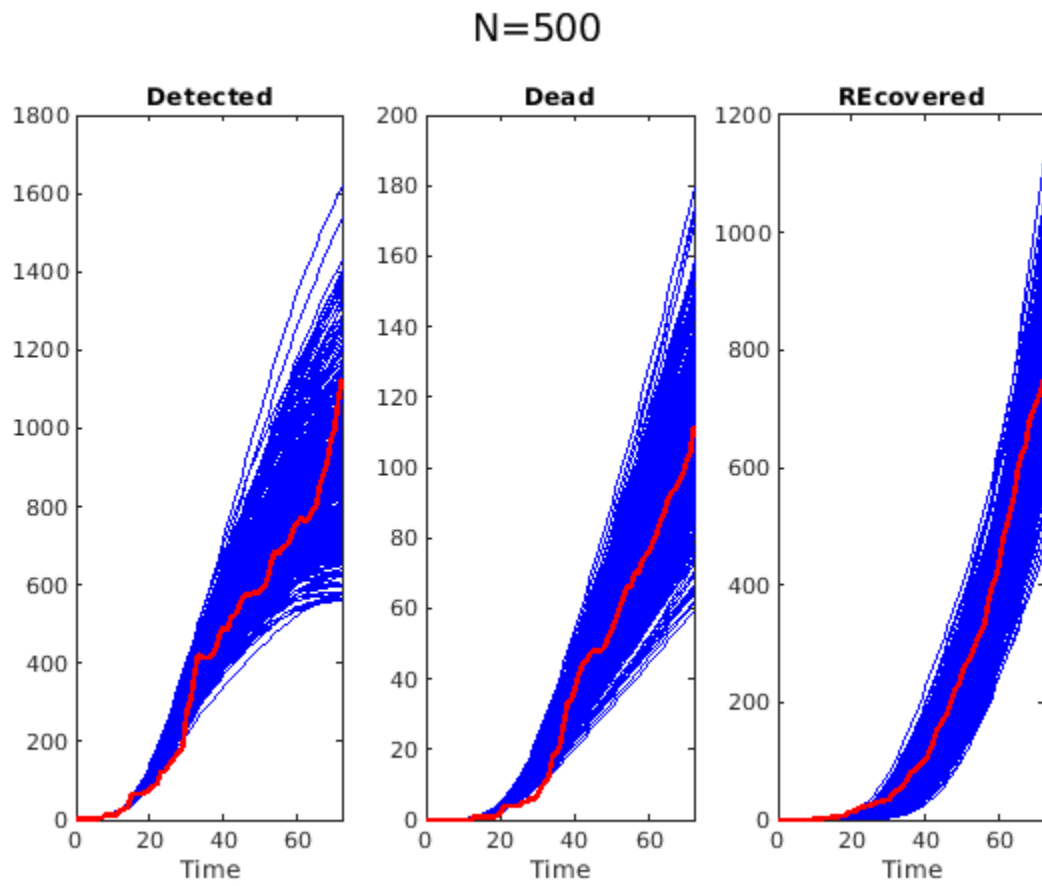
### 1.3. Identifiability analysis







## 1.4. Uncertainty analysis





---

## Chapter 2. Extension number2

### 2.1. Basic information

The extension to be validated consists of the time series from the data73 to the 115. The status of the validation is: COMPLETED.

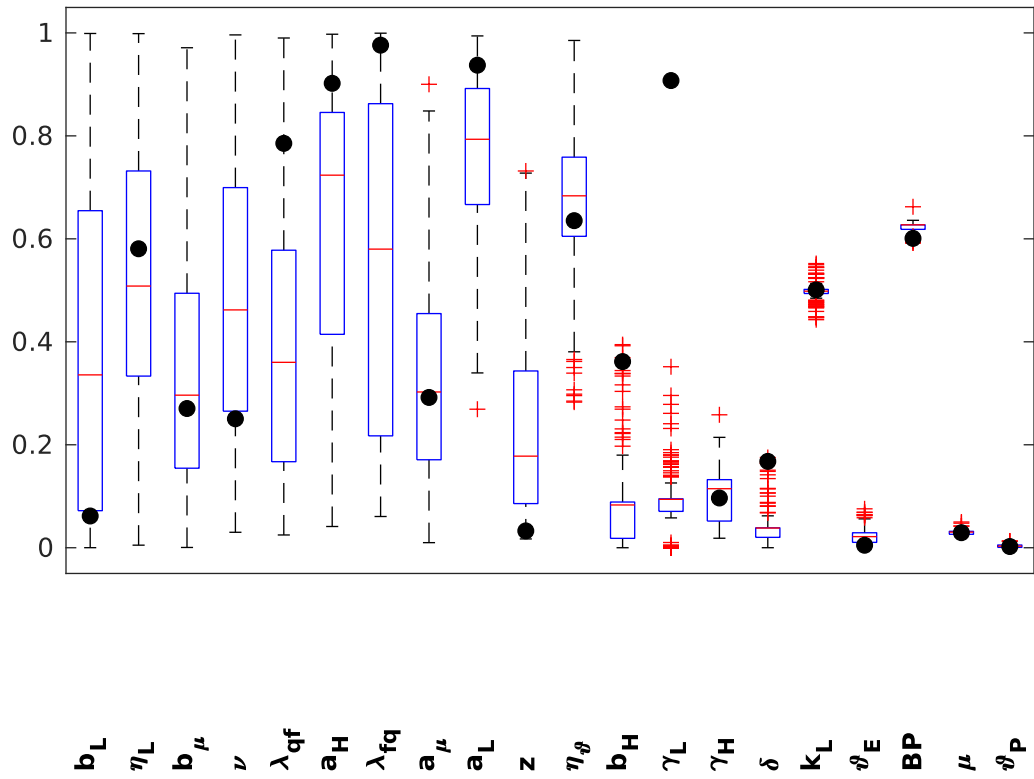
The number of estimations needed to perform the validation was1000.

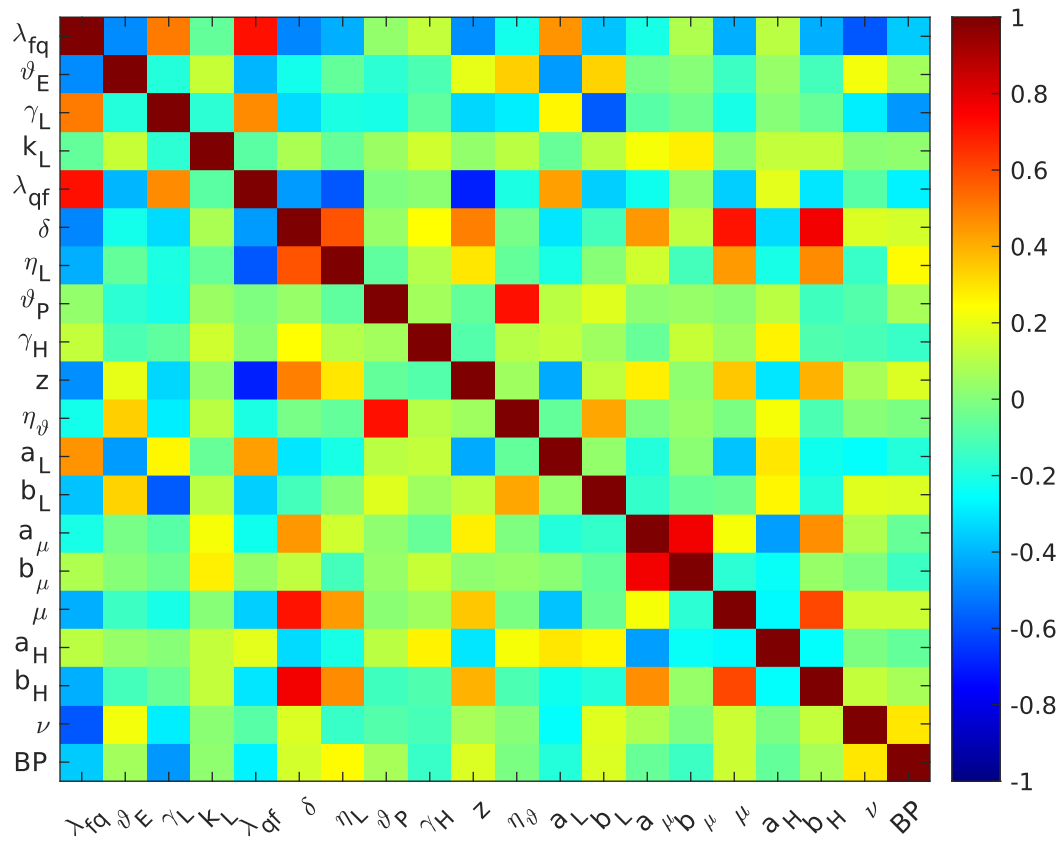
### 2.2. Estimated parameters with their intervals

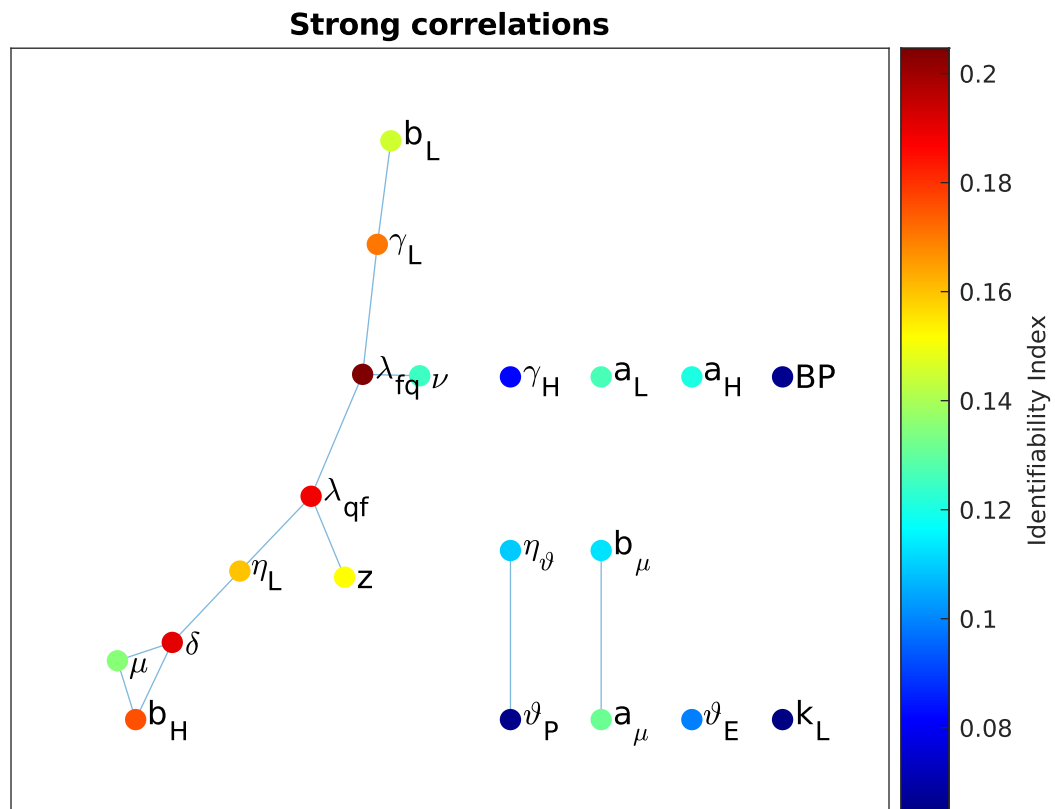
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.5191'	'0.641'	'0.58'	'0.9762'	'0.2047'
$\vartheta_E$	'0'	'0.0569'	'0.0216'	'0.0048'	'0.0995'
$\gamma_L$	'0.0326'	'0.1561'	'0.0944'	'0.9074'	'0.1704'
$k_L$	'5.3427'	'5.6265'	'5.4846'	'5.5077'	'0.0645'
$\lambda_{qf}$	'0.307'	'0.4133'	'0.3601'	'0.7854'	'0.1885'
$\delta$	'0'	'0.0158'	'0.0058'	'0.0252'	'0.1909'
$\eta_L$	'0.4537'	'0.5628'	'0.5083'	'0.5807'	'0.1598'
$\vartheta_P$	'0.0025'	'0.0038'	'0.0031'	'0.0024'	'0.0658'
$\gamma_H$	'0.0843'	'0.1454'	'0.1149'	'0.0966'	'0.0822'
$z$	'3.749'	'6.9647'	'5.3568'	'0.9811'	'0.1519'
$\eta_{\vartheta}$	'0.6473'	'0.7166'	'0.682'	'0.6353'	'0.1096'
$a_L$	'11.4574'	'12.7483'	'12.1029'	'14.1221'	'0.1267'
$b_L$	'4.8448'	'6.5562'	'5.7005'	'1.8633'	'0.1451'
$a_{\mu}$	'4.6471'	'5.8421'	'5.2446'	'5.087'	'0.1315'
$b_{\mu}$	'4.5065'	'5.7908'	'5.1487'	'4.7859'	'0.113'
$\mu$	'0.0036'	'0.0572'	'0.0304'	'0.0292'	'0.1354'
$a_H$	'10.4496'	'11.8126'	'11.1311'	'13.629'	'0.1206'
$b_H$	'1.2712'	'3.0593'	'2.1653'	'6.062'	'0.1758'
$\nu$	'205.4483'	'256.5066'	'230.9775'	'125.2377'	'0.1248'
BP	'72.2412'	'72.7588'	'72.5'	'69.5'	'0.0663'

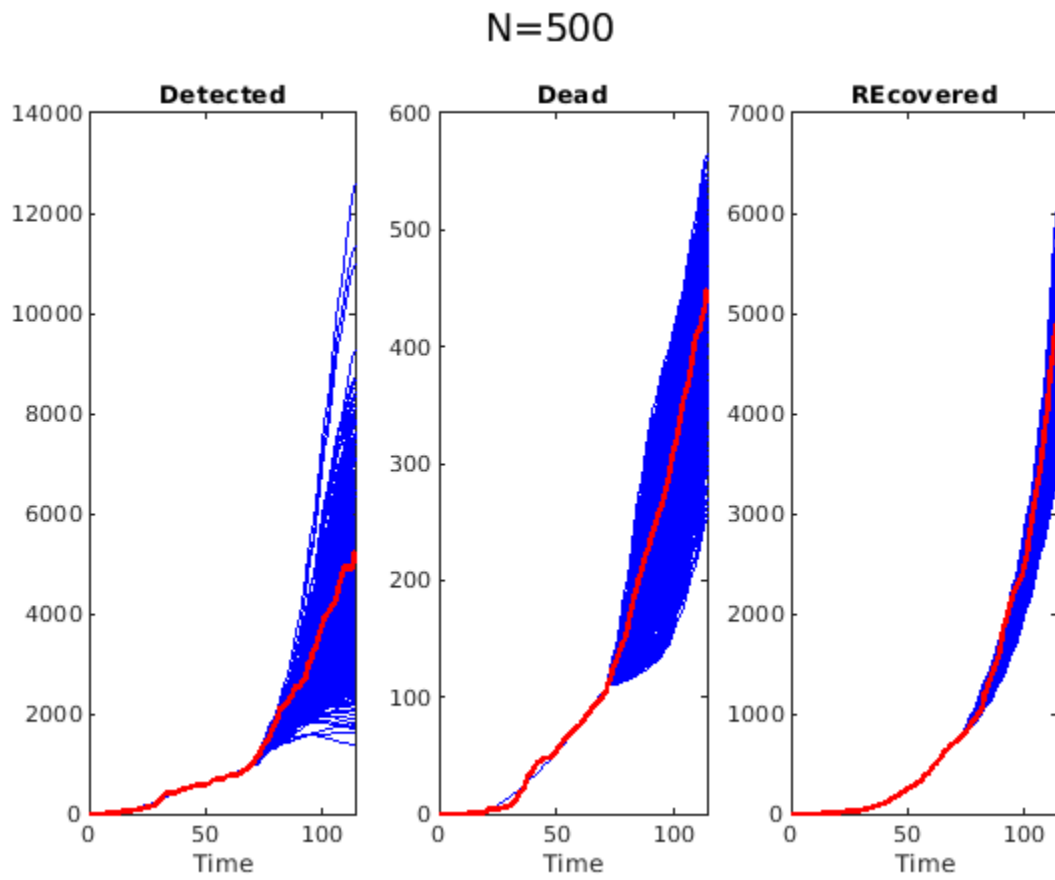
### 2.3. Identifiability analysys







## 2.4. Uncertainty analysis



---

## Chapter 3. Extension number3

### 3.1. Basic information

The extension to be validated consists of the time series from the data115 to the 156. The status of the validation is: COMPLETED.

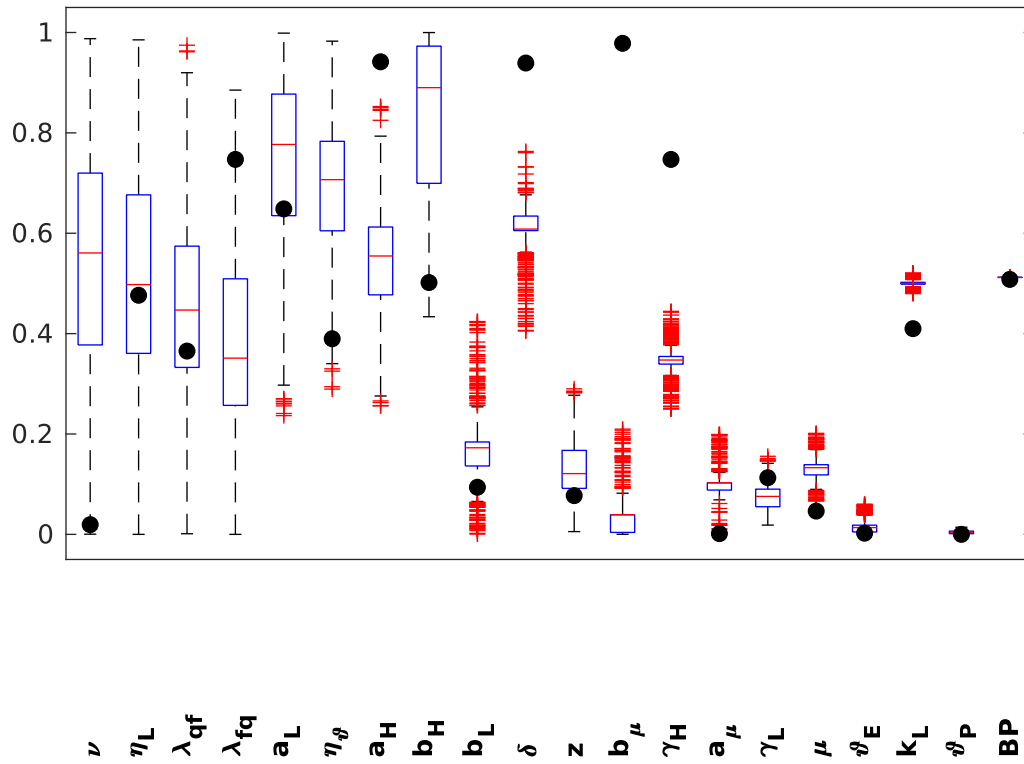
The number of estimations needed to perform the validation was1000.

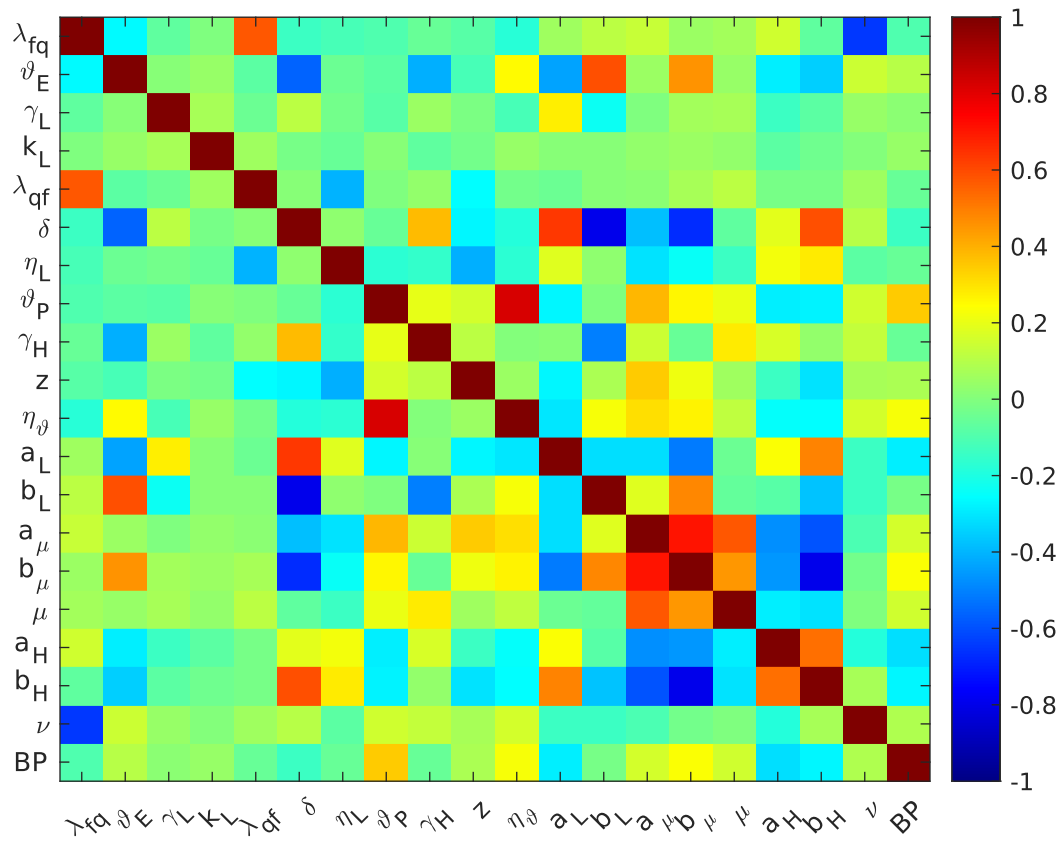
### 3.2. Estimated parameters with their intervals

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

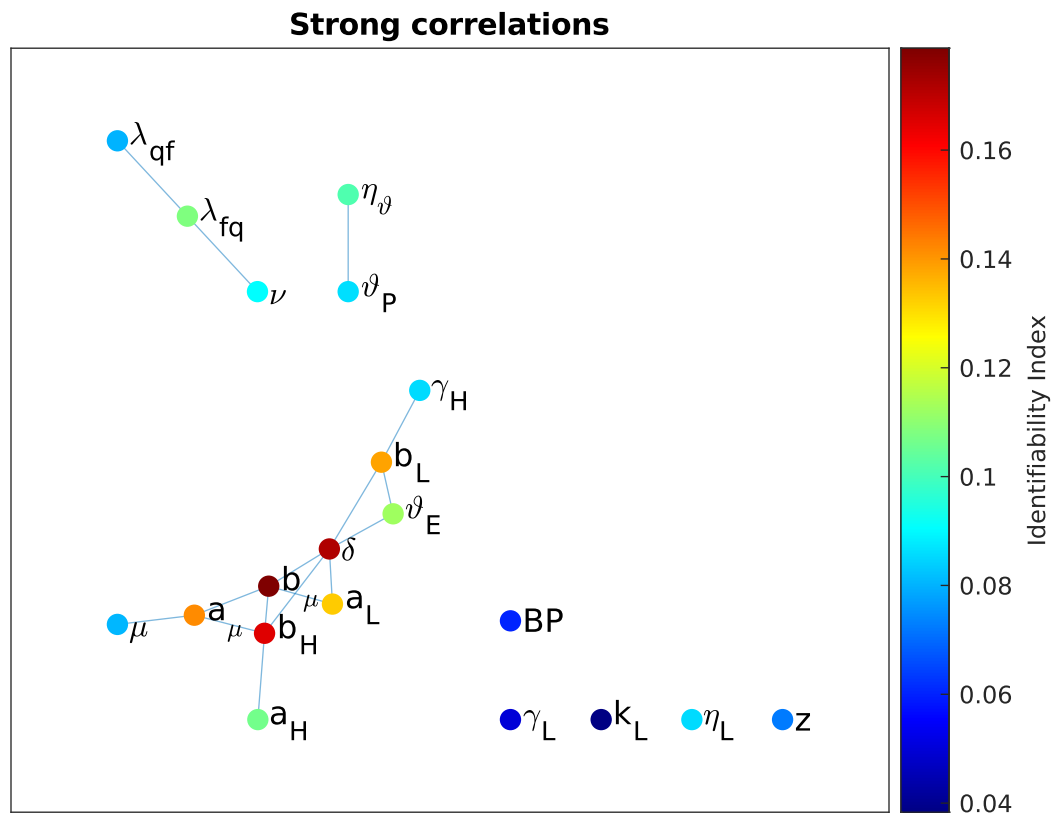
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3295'	'0.3727'	'0.3511'	'0.7471'	'0.1084'
$\vartheta_E$	'0.0048'	'0.0224'	'0.0136'	'0.0023'	'0.1125'
$\gamma_L$	'0.0692'	'0.0821'	'0.0756'	'0.1129'	'0.0502'
$k_L$	'5.4572'	'5.5431'	'5.5001'	'4.6889'	'0.0383'
$\lambda_{qf}$	'0.4275'	'0.4664'	'0.4469'	'0.3652'	'0.0804'
$\delta$	'0.0886'	'0.0939'	'0.0912'	'0.1409'	'0.1716'
$\eta_L$	'0.4755'	'0.52'	'0.4977'	'0.4764'	'0.0858'
$\vartheta_P$	'0.0036'	'0.0043'	'0.0039'	'0'	'0.0861'
$\gamma_H$	'0.3347'	'0.3601'	'0.3474'	'0.7471'	'0.0856'
$z$	'3.3534'	'3.9123'	'3.6329'	'2.3152'	'0.0725'
$\eta_{\vartheta}$	'0.6925'	'0.7211'	'0.7068'	'0.3898'	'0.1015'
$a_L$	'11.5612'	'12.1929'	'11.877'	'10.08'	'0.1329'
$b_L$	'3.1001'	'3.7309'	'3.4155'	'2.3138'	'0.1382'
$a_{\mu}$	'2.2397'	'2.6369'	'2.4383'	'1.0213'	'0.1419'
$b_{\mu}$	'1.1563'	'1.9382'	'1.5472'	'14.6979'	'0.1787'
$\mu$	'0.1279'	'0.1378'	'0.1328'	'0.0464'	'0.081'
$a_H$	'8.5858'	'8.9461'	'8.7659'	'14.1833'	'0.1065'
$b_H$	'13.2021'	'13.7207'	'13.4614'	'8.0247'	'0.1651'
$\nu$	'268.3883'	'292.3579'	'280.3731'	'9.6789'	'0.091'
BP	'115.4165'	'115.5835'	'115.5'	'115.1697'	'0.0605'

### 3.3. Identifiability analysis

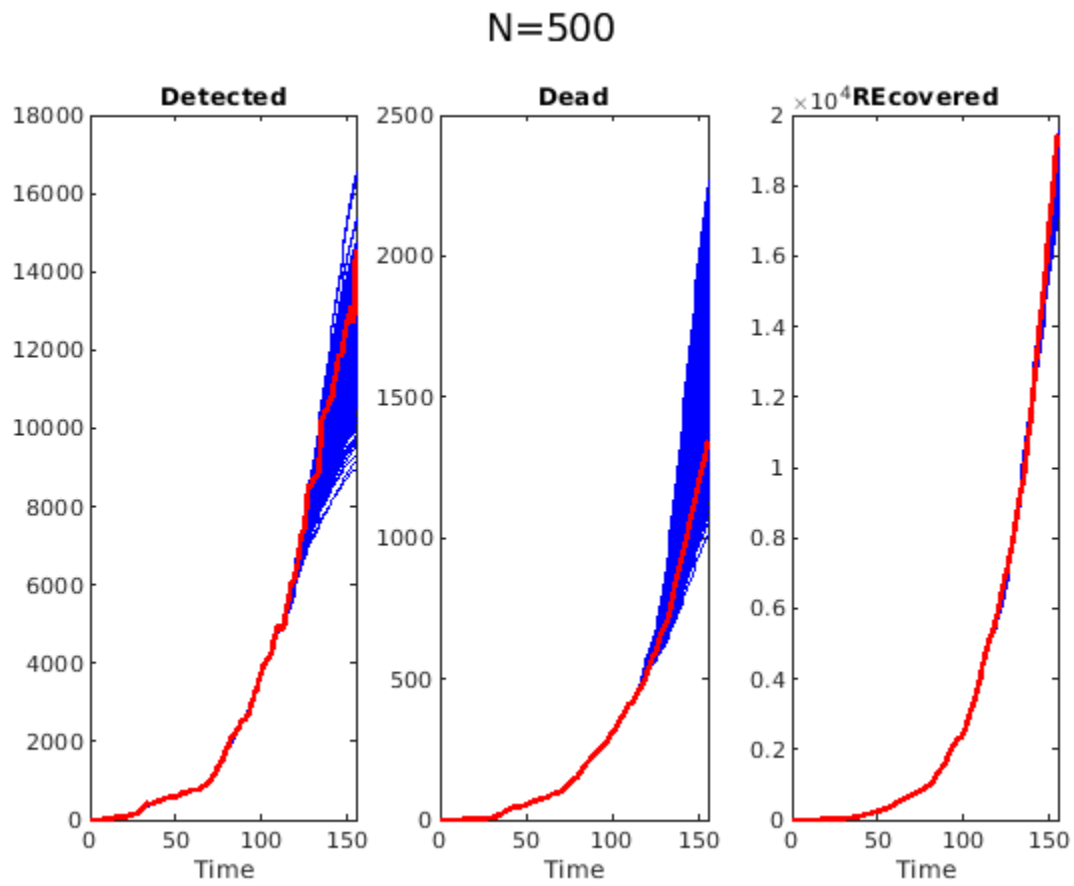








### 3.4. Uncertainty analysys



---

## Chapter 4. Extension number4

### 4.1. Basic information

The extension to be validated consists of the time series from the data156 to the 191. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

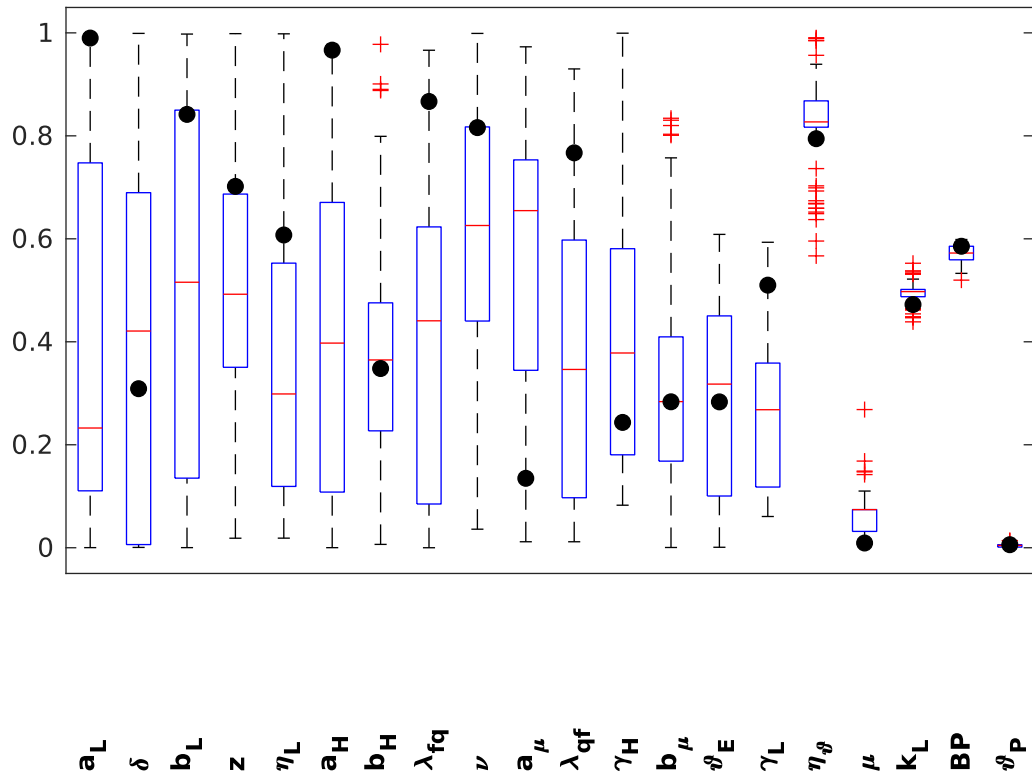
### 4.2. Estimated parameters with their intervals

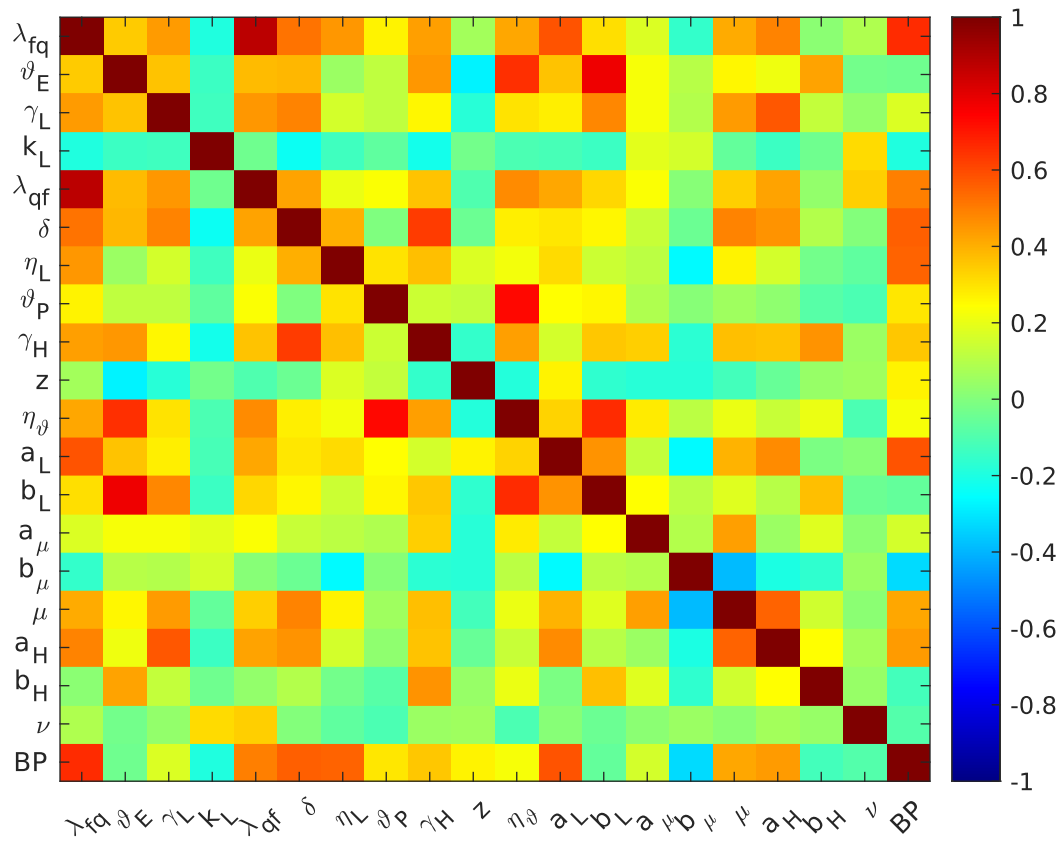
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

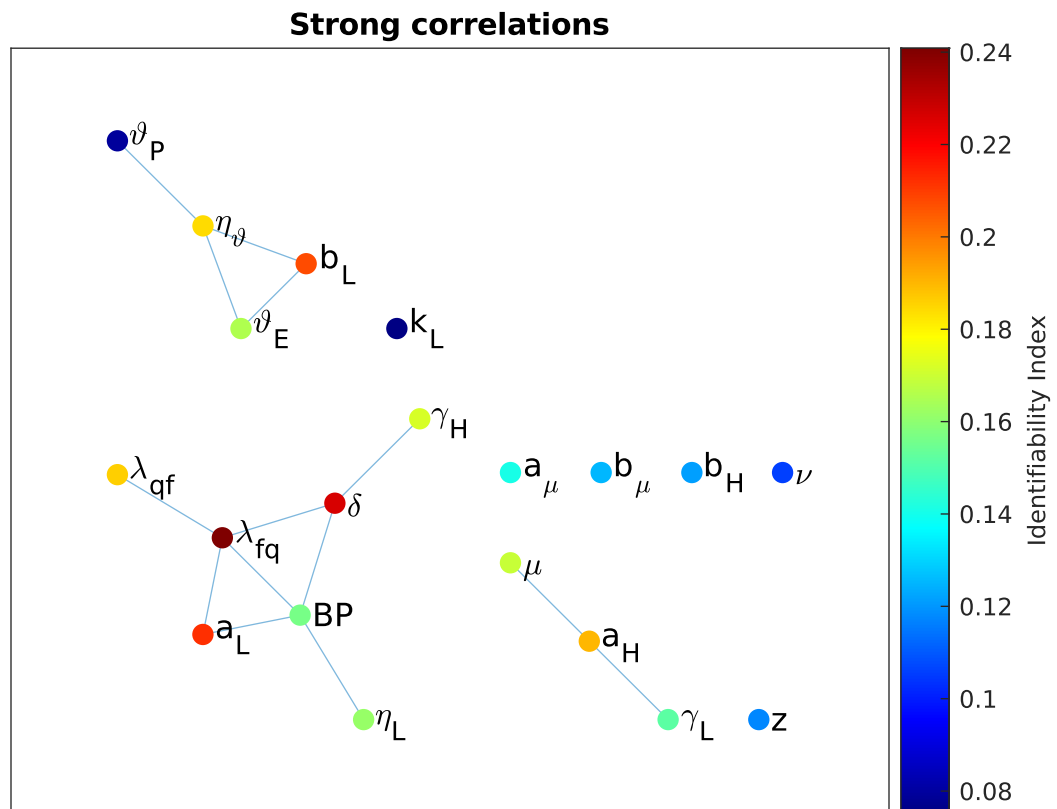
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.6978'	'1'	'0.4407'	'0.8667'	'0.2409'
$\vartheta_E$	'0.213'	'0.4883'	'0.3178'	'0.2833'	'0.1653'
$\gamma_L$	'0.1324'	'0.5665'	'0.2681'	'0.51'	'0.1518'
$k_L$	'1'	'9.208'	'5.4771'	'5.2511'	'0.0754'
$\lambda_{qf}$	'0.2641'	'0.8096'	'0.3463'	'0.767'	'0.1859'
$\delta$	'0.0066'	'0.1043'	'0.0631'	'0.0463'	'0.2262'
$\eta_L$	'0.0388'	'0.9608'	'0.2987'	'0.6074'	'0.1618'
$\vartheta_P$	'0.0018'	'0.0122'	'0.0044'	'0.0059'	'0.0797'
$\gamma_H$	'0.02'	'1'	'0.3782'	'0.2434'	'0.172'
$z$	'1.422'	'28.8'	'14.7704'	'21.055'	'0.118'
$\eta_{\vartheta}$	'0.7023'	'0.9678'	'0.8271'	'0.7944'	'0.1846'
$a_L$	'1.28'	'15'	'4.2554'	'14.8586'	'0.2119'
$b_L$	'4.1046'	'14.547'	'8.2193'	'12.7832'	'0.2076'
$a_{\mu}$	'1.2688'	'13.9132'	'10.1664'	'2.8876'	'0.1409'
$b_{\mu}$	'2.0178'	'13.7946'	'4.9732'	'4.9683'	'0.1254'
$\mu$	'0'	'0.0206'	'0.0741'	'0.0092'	'0.1692'
$a_H$	'1.28'	'15'	'6.5644'	'14.5304'	'0.1901'
$b_H$	'1.623'	'15'	'6.1061'	'5.8727'	'0.1213'
$\nu$	'297.7855'	'484.8339'	'312.923'	'407.9844'	'0.1061'
BP	'159.4227'	'163.1928'	'158.5'	'159.5'	'0.1567'

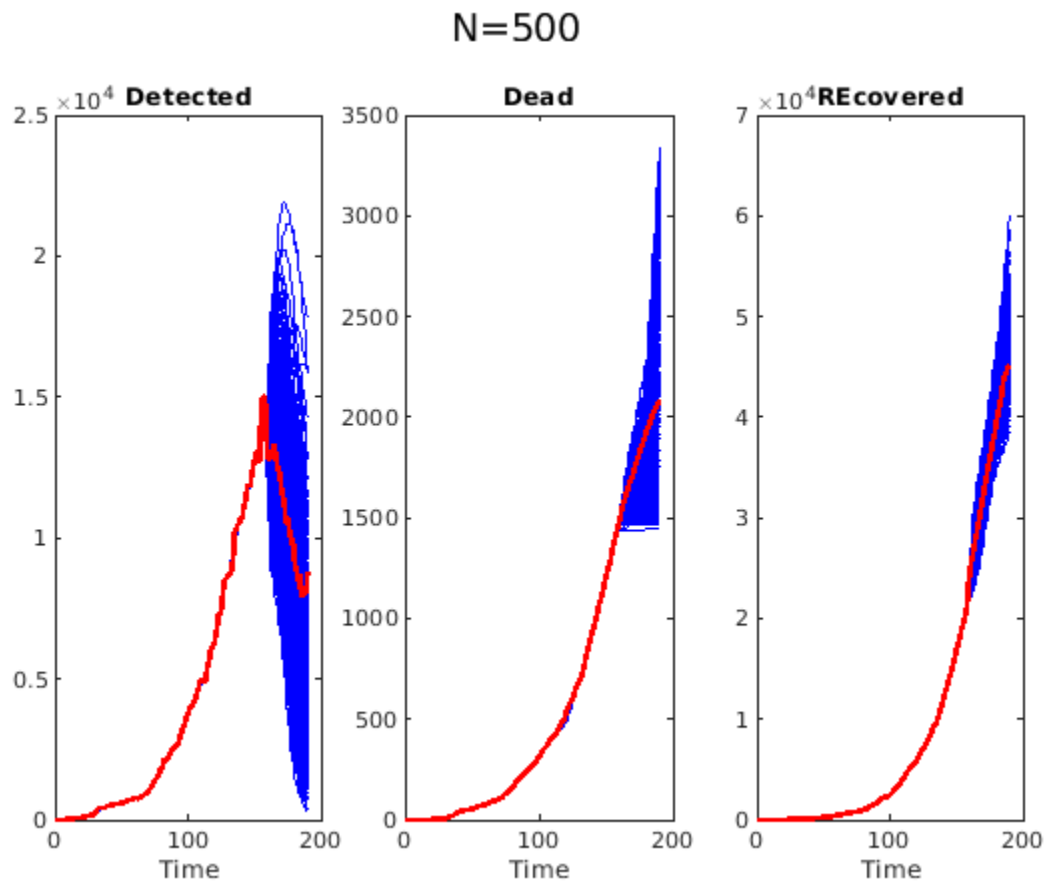
### 4.3. Identifiability analysis







#### 4.4. Uncertainty analysis



---

## Chapter 5. Extension number5

### 5.1. Basic information

The extension to be validated consists of the time series from the data191 to the 223. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was2000.

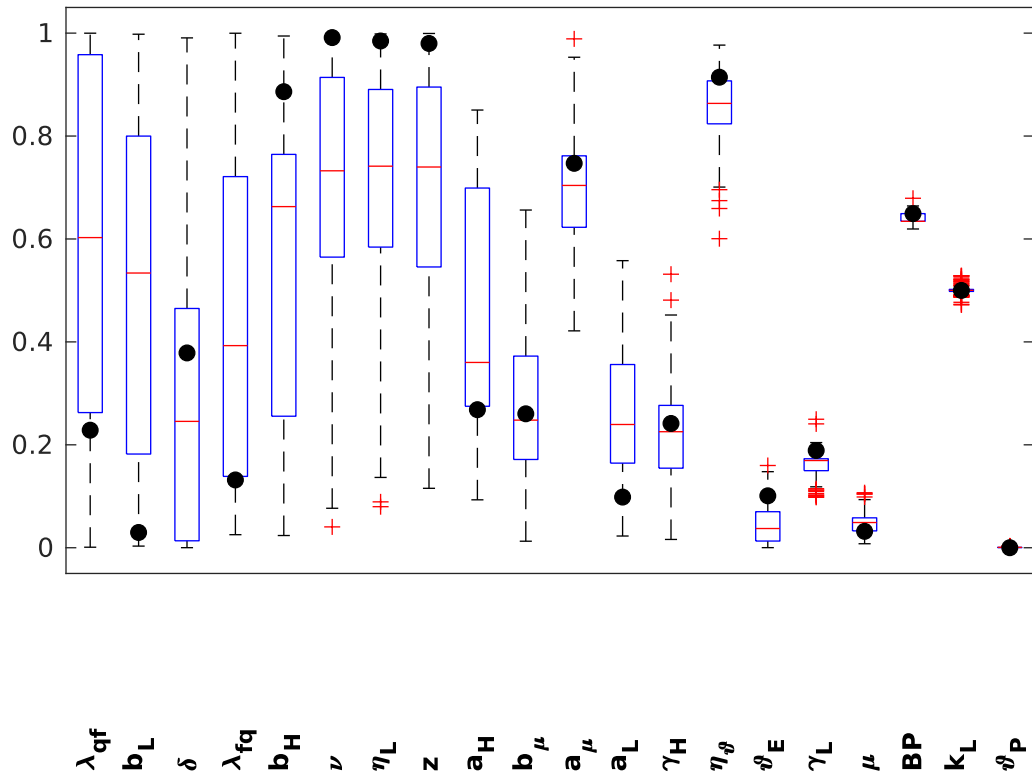
### 5.2. Estimated parameters with their intervals

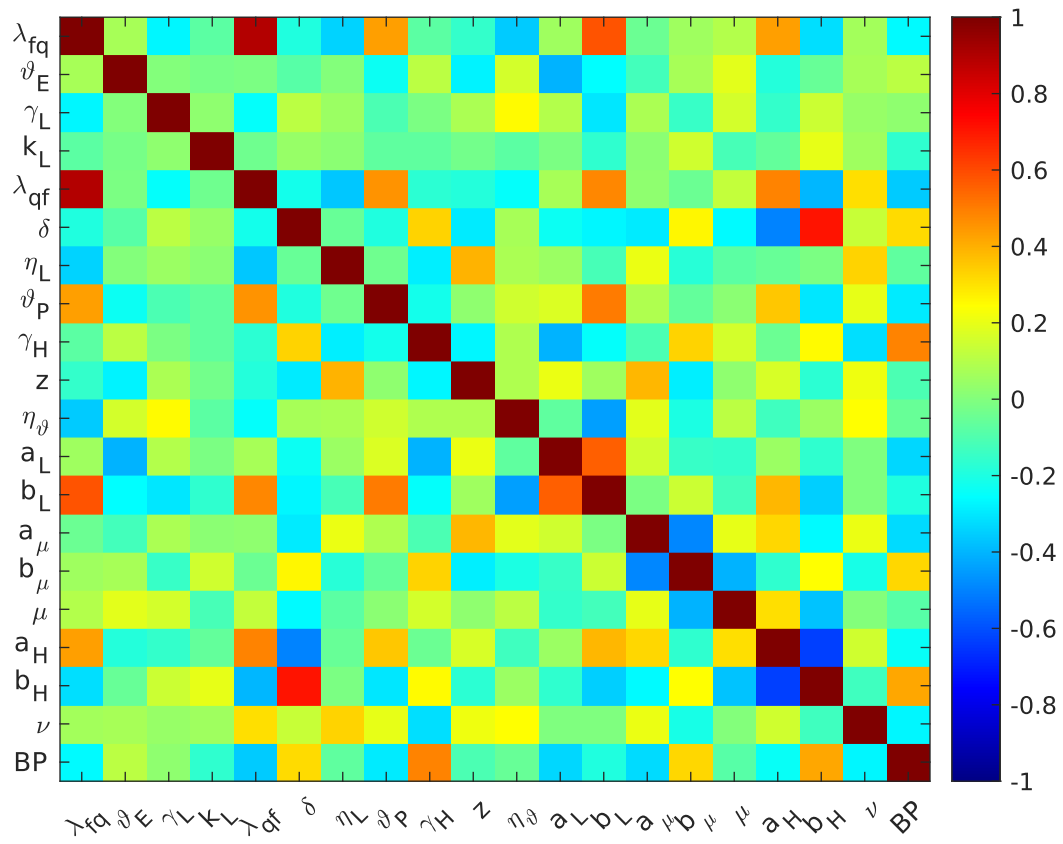
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

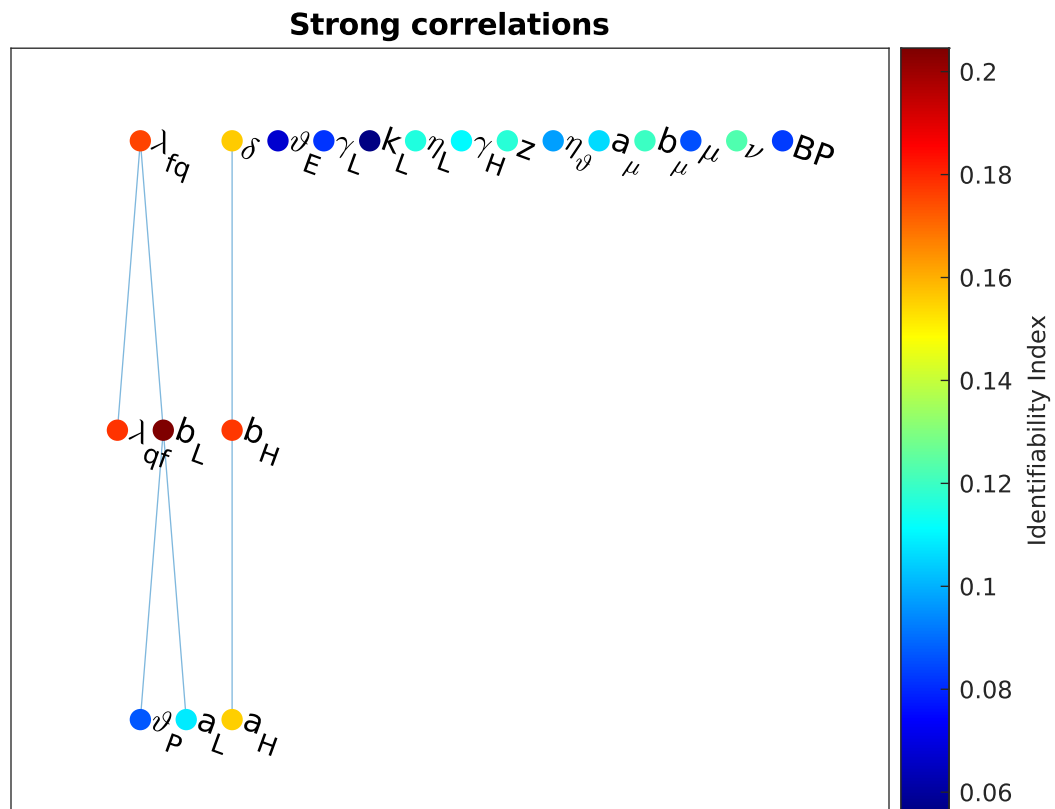
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3264'	'0.4592'	'0.3928'	'0.1317'	'0.176'
$\vartheta_E$	'0.0267'	'0.0508'	'0.0387'	'0.1009'	'0.0676'
$\gamma_L$	'0.1414'	'0.1975'	'0.1695'	'0.189'	'0.0819'
$k_L$	'5.3776'	'5.6259'	'5.5018'	'5.5'	'0.0561'
$\lambda_{qf}$	'0.5259'	'0.6794'	'0.6027'	'0.2284'	'0.1782'
$\delta$	'0.0275'	'0.0461'	'0.0368'	'0.0568'	'0.1564'
$\eta_L$	'0.6815'	'0.7966'	'0.739'	'0.9847'	'0.1163'
$\vartheta_P$	'0'	'0.0018'	'0.0007'	'0.0001'	'0.0873'
$\gamma_H$	'0.1903'	'0.2626'	'0.2265'	'0.2415'	'0.1107'
$z$	'20.7049'	'23.6854'	'22.1952'	'29.3976'	'0.1175'
$\eta_{\vartheta}$	'0.8291'	'0.8975'	'0.8633'	'0.9143'	'0.0975'
$a_L$	'3.9598'	'4.7823'	'4.371'	'2.3779'	'0.1085'
$b_L$	'7.3902'	'9.557'	'8.4736'	'1.4154'	'0.2046'
$a_{\mu}$	'10.3363'	'11.3649'	'10.8506'	'11.4578'	'0.106'
$b_{\mu}$	'3.8185'	'5.1266'	'4.4726'	'4.6438'	'0.1204'
$\mu$	'0.0255'	'0.073'	'0.0492'	'0.0319'	'0.0862'
$a_H$	'5.2575'	'6.8779'	'6.0677'	'4.7559'	'0.1556'
$b_H$	'9.3992'	'11.1615'	'10.2804'	'13.4071'	'0.1774'
$\nu$	'335.944'	'396.5283'	'366.2362'	'495.6663'	'0.123'
BP	'198.3183'	'198.6817'	'198.5'	'199.5'	'0.083'



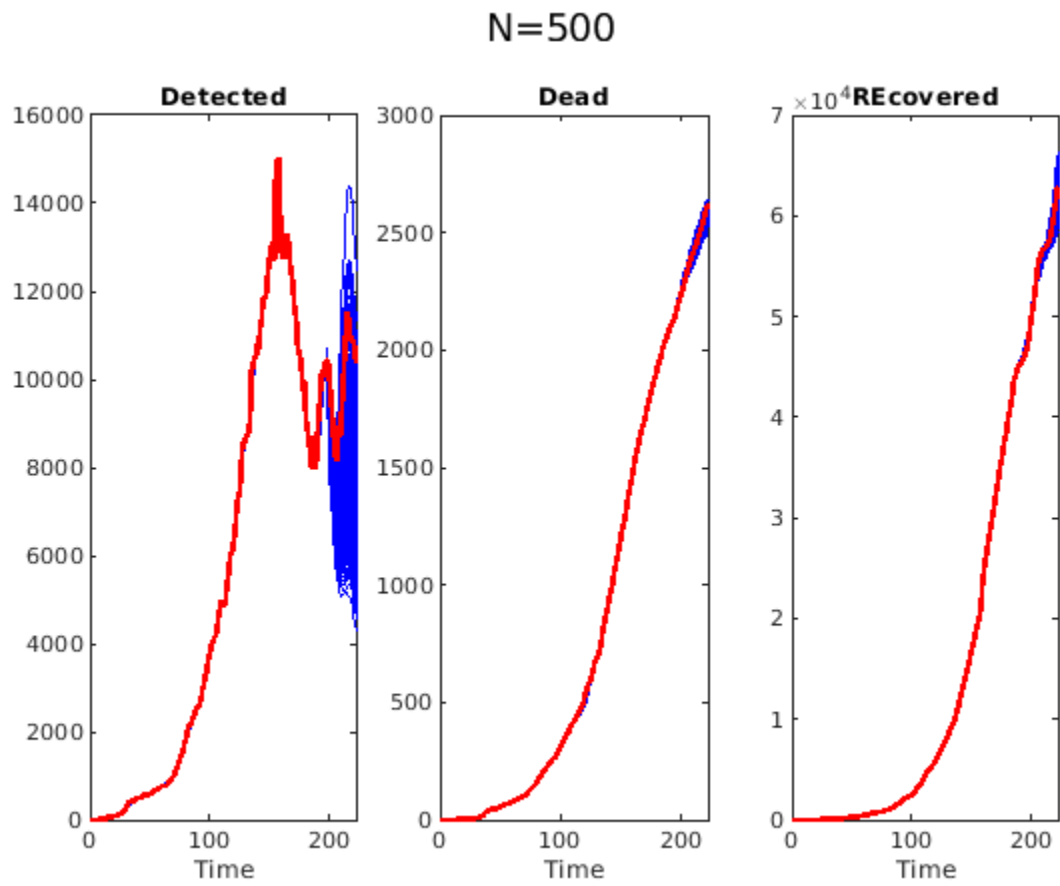
### 5.3. Identifiability analysys







## 5.4. Uncertainty analysis



---

## Chapter 6. Extension number6

### 6.1. Basic information

The extension to be validated consists of the time series from the data223 to the 299. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

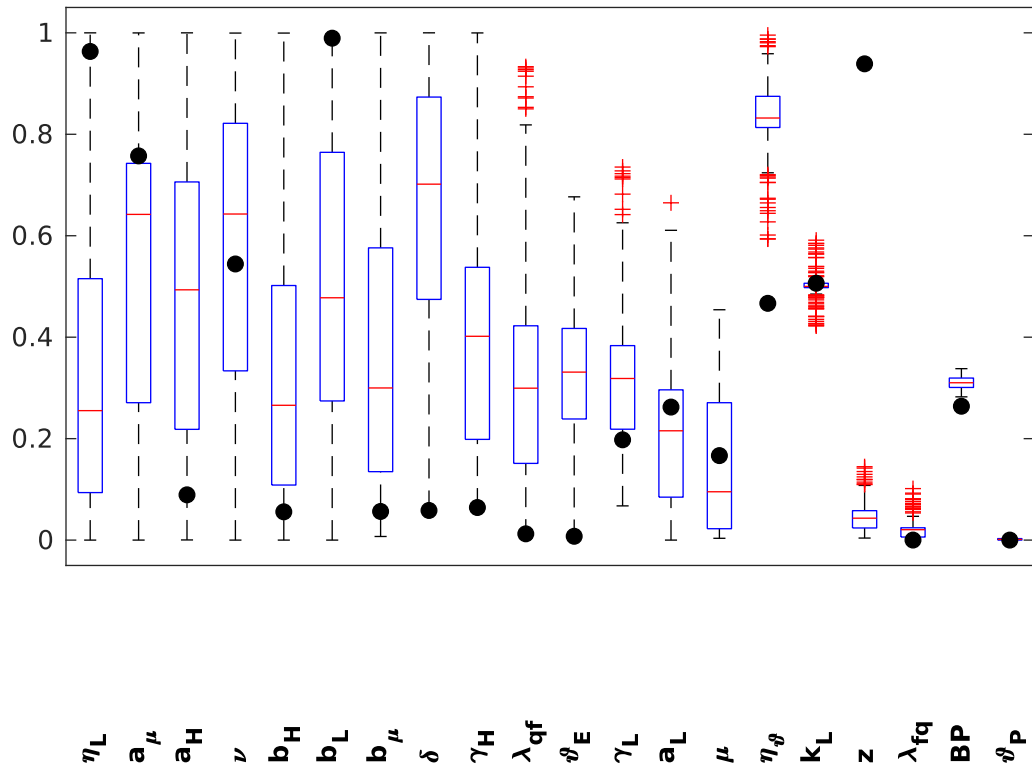
### 6.2. Estimated parameters with their intervals

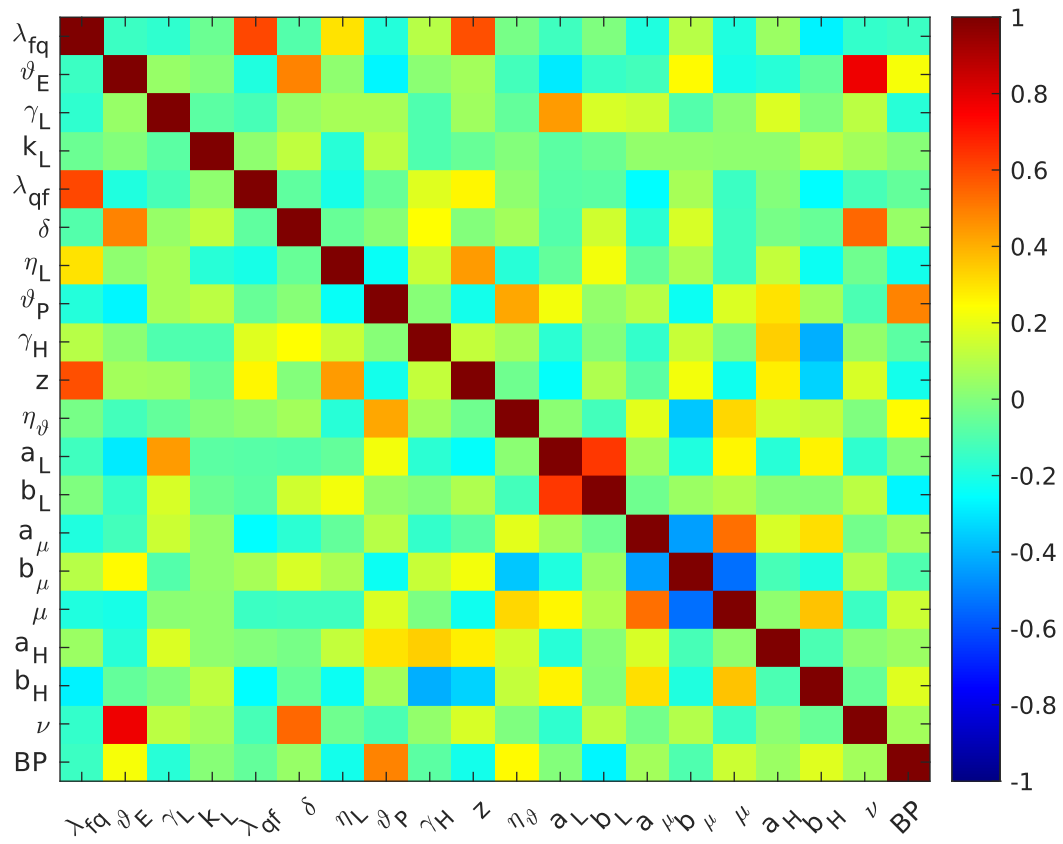
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

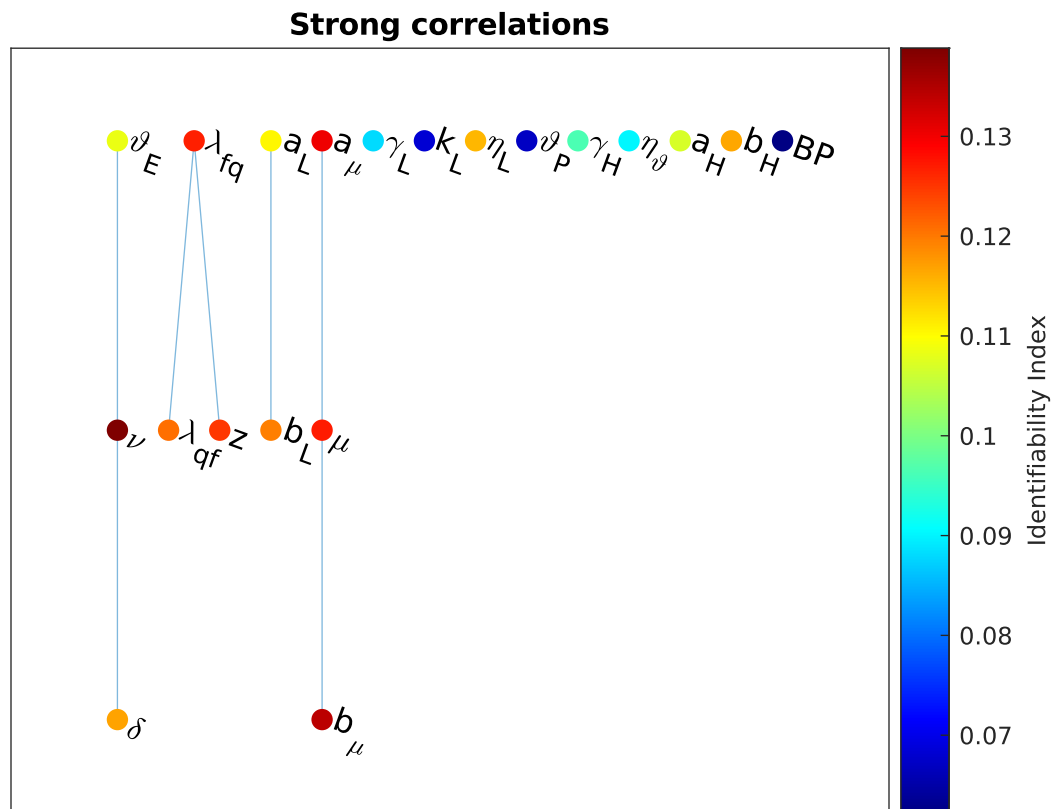
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0002'	'0.0205'	'0.0001'	'0.1266'
\vartheta_E	'0.0017'	'0.0155'	'0.3312'	'0.0075'	'0.1085'
\gamma_L	'0.1529'	'0.2008'	'0.3186'	'0.1977'	'0.0883'
k_L	'1.1237'	'6.8842'	'5.5011'	'5.5572'	'0.0683'
\lambda_{qf}	'0.0093'	'0.0164'	'0.2995'	'0.0124'	'0.1208'
\delta	'0.0015'	'0.0171'	'0.1053'	'0.0088'	'0.1169'
\eta_L	'0.3005'	'1'	'0.2552'	'0.9633'	'0.1154'
\vartheta_P	'0'	'0.0001'	'0.0013'	'0'	'0.0673'
\gamma_H	'0.0641'	'0.1846'	'0.4018'	'0.0642'	'0.0964'
z	'10.2503'	'30'	'1.2961'	'28.1669'	'0.1249'
\eta_{\vartheta}	'0.4504'	'0.4835'	'0.8321'	'0.4667'	'0.0901'
a_L	'2.6467'	'7.6164'	'4.0168'	'4.6713'	'0.1107'
b_L	'8.6931'	'15'	'7.688'	'14.8523'	'0.1196'
a_{\mu}	'6.3201'	'12.1004'	'9.989'	'11.6032'	'0.1303'
b_{\mu}	'1.3422'	'5.8727'	'5.1989'	'1.7906'	'0.1341'
\mu	'0.0466'	'0.2947'	'0.0953'	'0.1666'	'0.1271'
a_H	'1.2869'	'4.4609'	'7.9074'	'2.2495'	'0.107'
b_H	'1.4633'	'7.2434'	'4.7205'	'1.7802'	'0.1164'
\nu	'261.6211'	'365.1208'	'321.4045'	'272.1664'	'0.1388'
BP	'199.9286'	'229.5294'	'224.5'	'219.5'	'0.0623'

### 6.3. Identifiability analysis

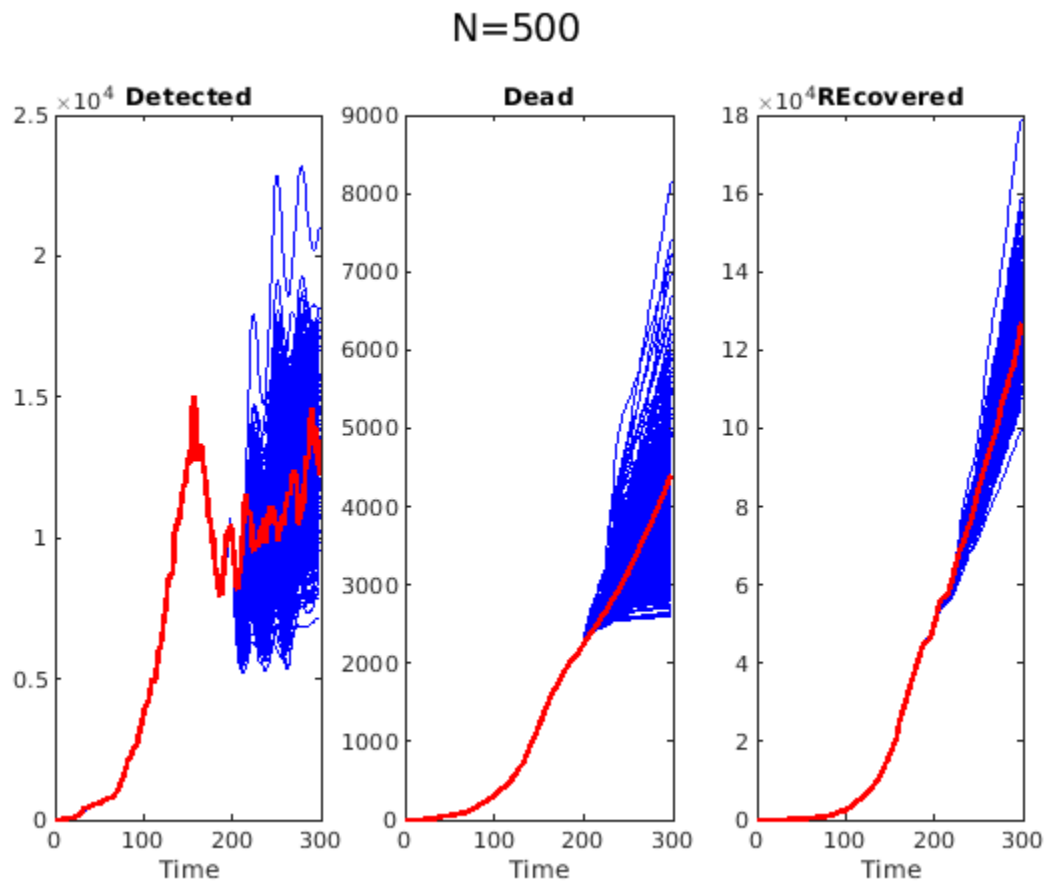








## 6.4. Uncertainty analysis



---

## Chapter 7. Extension number7

### 7.1. Basic information

The extension to be validated consists of the time series from the data299 to the 327. The status of the validation is: COMPLETED.

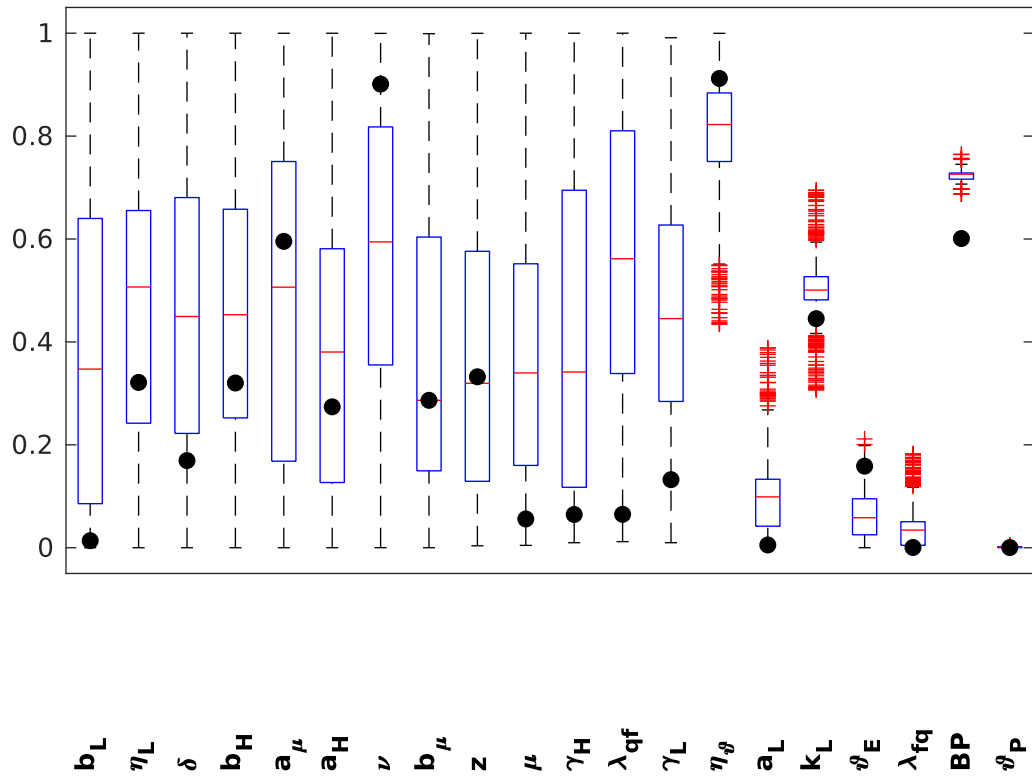
The number of estimations needed to perform the validation was1000.

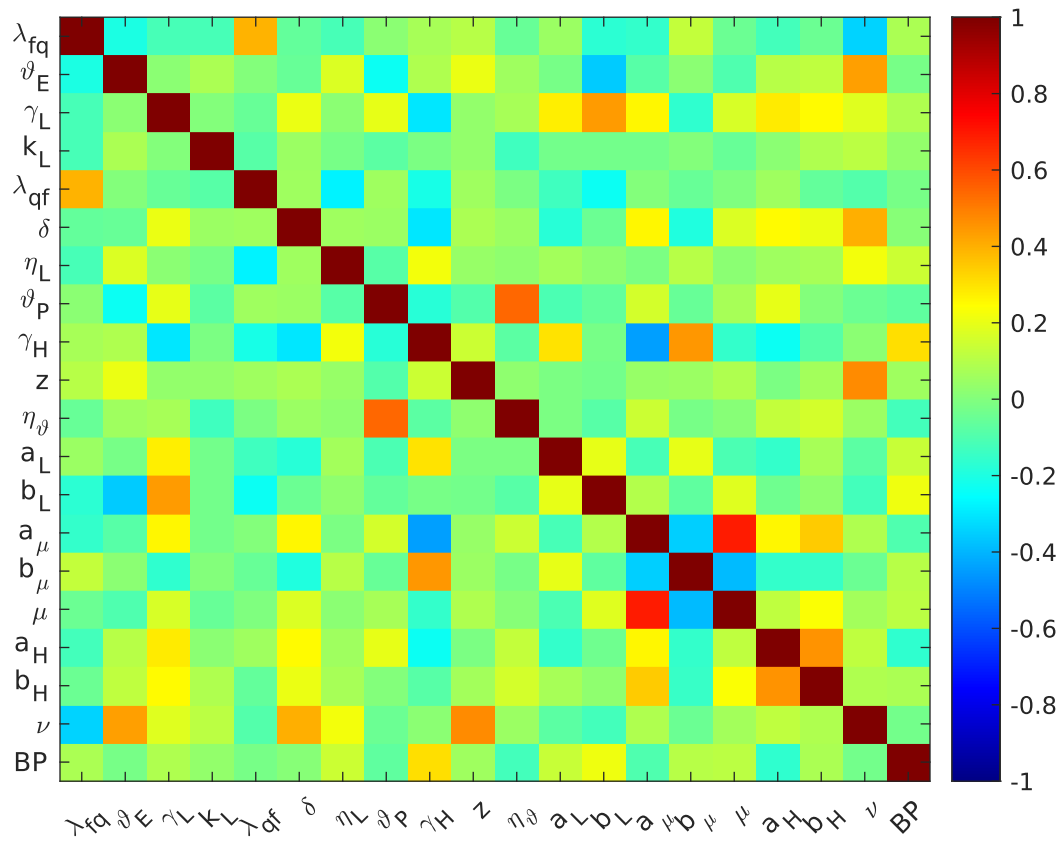
### 7.2. Estimated parameters with their intervals

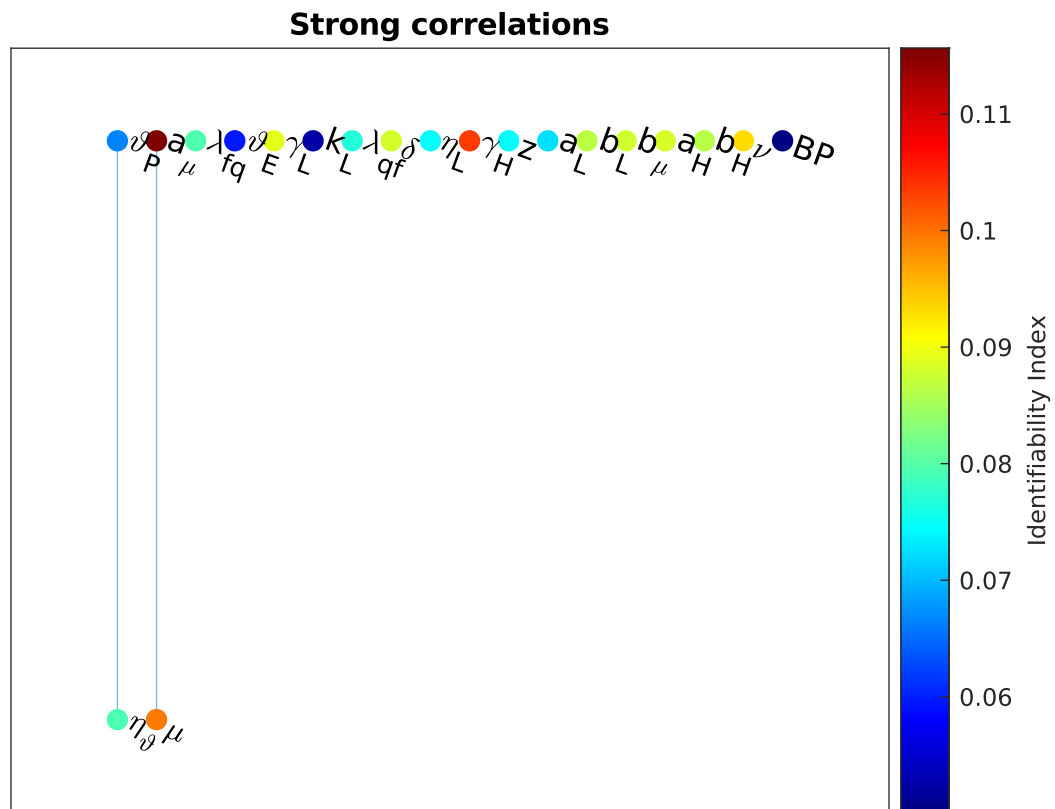
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0094'	'0.0593'	'0.0344'	'0.0005'	'0.0796'
$\vartheta_E$	'0.0532'	'0.0633'	'0.0583'	'0.1585'	'0.0596'
$\gamma_L$	'0.4205'	'0.4702'	'0.4454'	'0.1323'	'0.0892'
$k_L$	'5.3711'	'5.6421'	'5.5066'	'5.0066'	'0.0524'
$\lambda_{qf}$	'0.5332'	'0.5902'	'0.5617'	'0.0649'	'0.0767'
$\delta$	'0.063'	'0.0718'	'0.0674'	'0.0254'	'0.0882'
$\eta_L$	'0.479'	'0.5345'	'0.5068'	'0.3212'	'0.0748'
$\vartheta_P$	'0.0007'	'0.0011'	'0.0009'	'0.0004'	'0.0665'
$\gamma_H$	'0.3084'	'0.3748'	'0.3416'	'0.0646'	'0.1034'
$z$	'8.7146'	'10.4598'	'9.5872'	'9.9667'	'0.0749'
$\eta_{\vartheta}$	'0.8029'	'0.8421'	'0.8225'	'0.9121'	'0.0793'
$a_L$	'2.1093'	'2.6576'	'2.3834'	'1.0751'	'0.0726'
$b_L$	'5.4207'	'6.3003'	'5.8605'	'1.1914'	'0.0867'
$a_{\mu}$	'7.628'	'8.5502'	'8.0891'	'9.3363'	'0.1156'
$b_{\mu}$	'4.6034'	'5.4195'	'5.0114'	'5.0109'	'0.0878'
$\mu$	'0.3129'	'0.3666'	'0.3397'	'0.0559'	'0.0995'
$a_H$	'5.9497'	'6.7011'	'6.3254'	'4.8341'	'0.0884'
$b_H$	'6.9382'	'7.7415'	'7.3399'	'5.4823'	'0.0864'
$\nu$	'281.7782'	'312.5874'	'297.1828'	'450.5308'	'0.0933'
BP	'298.3578'	'298.6422'	'298.5'	'285.5'	'0.0501'

### 7.3. Identifiability analysis

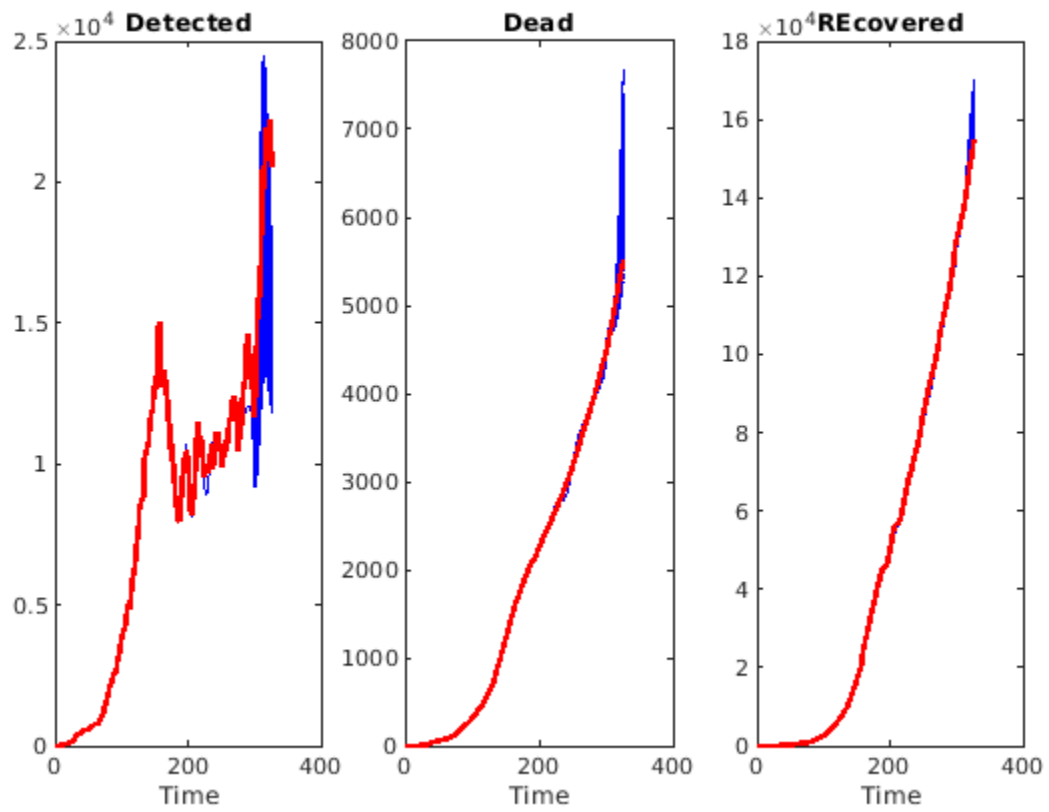






## 7.4. Uncertainty analysys

N=500



---

## Chapter 8. Extension number8

### 8.1. Basic information

The extension to be validated consists of the time series from the data327 to the 343. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was3000.

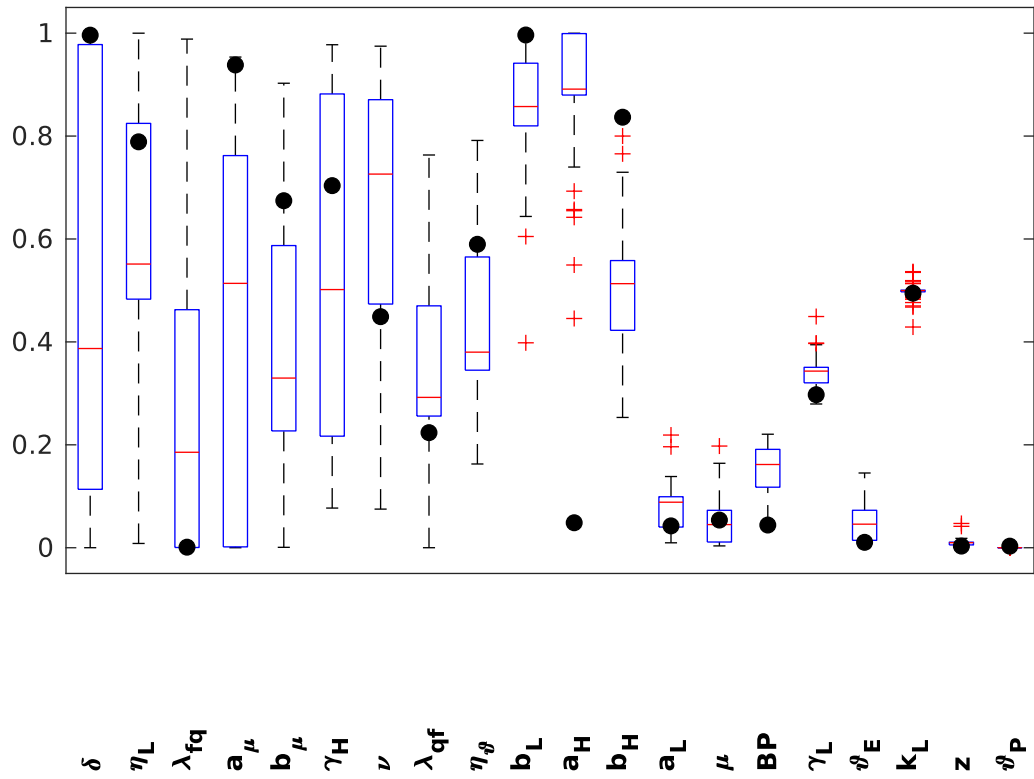
### 8.2. Estimated parameters with their intervals

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

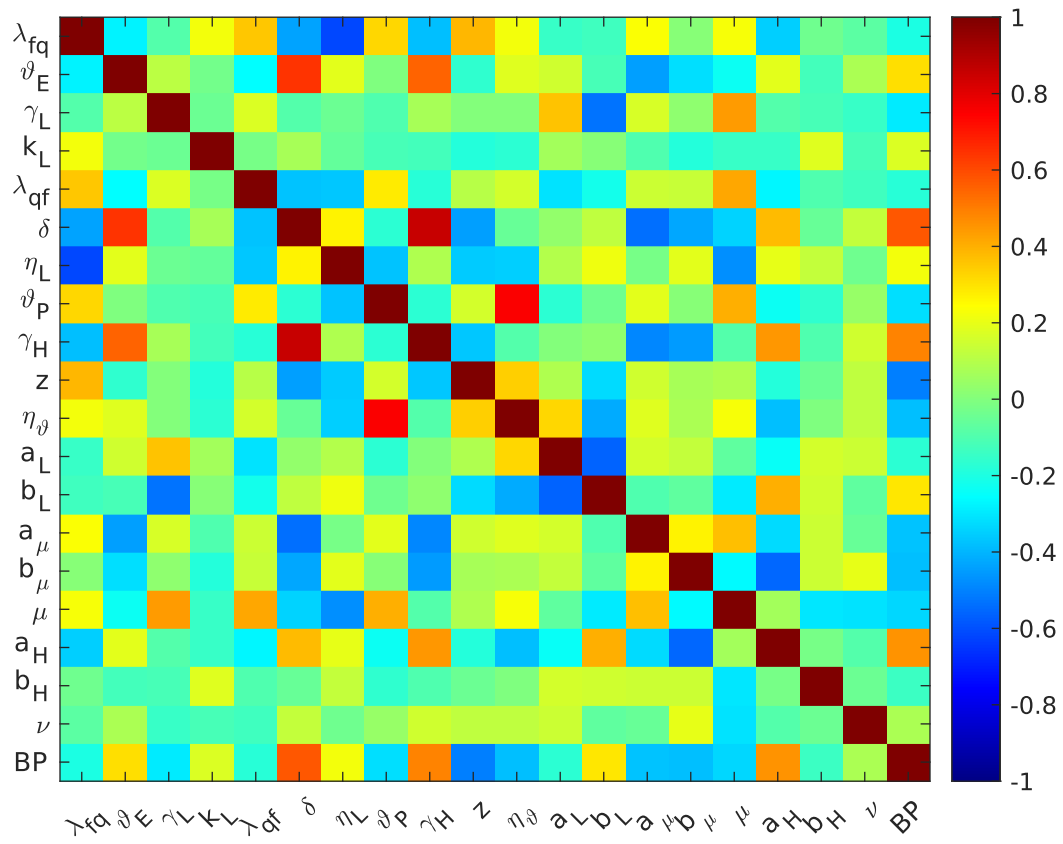
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

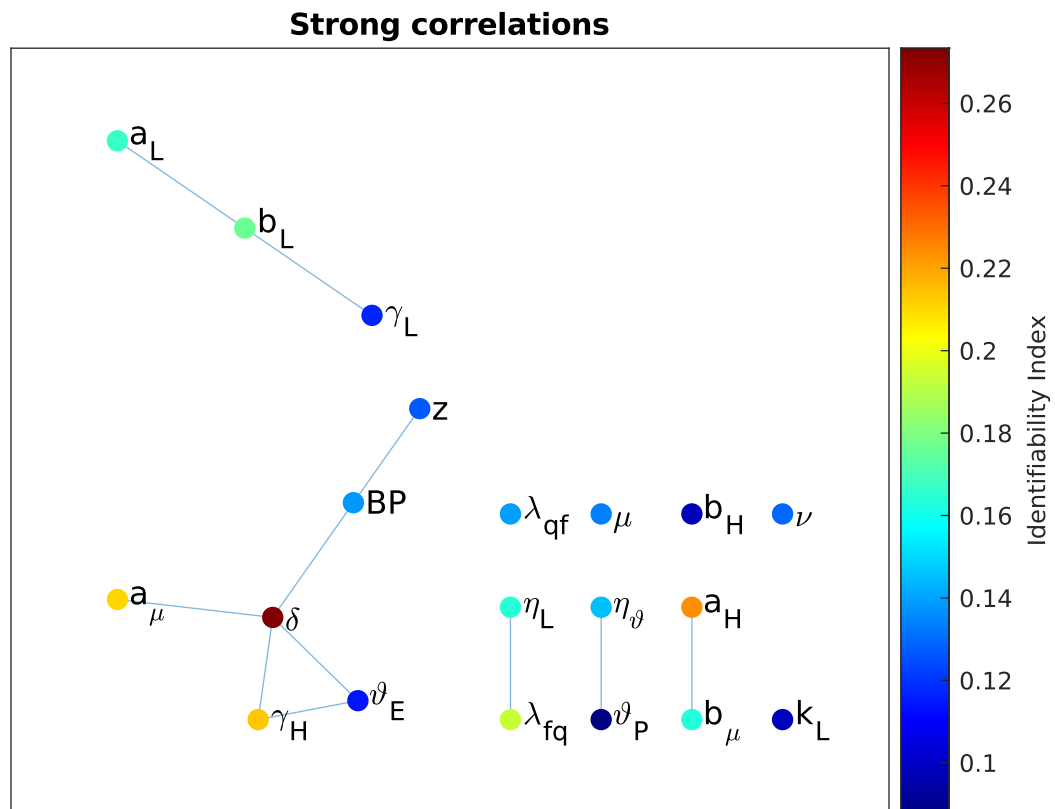
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0025'	'0.1855'	'0.0011'	'0.1936'
$\vartheta_E$	'0.0012'	'0.0227'	'0.0458'	'0.0105'	'0.1142'
$\gamma_L$	'0.2935'	'0.3657'	'0.3432'	'0.2974'	'0.1173'
$k_L$	'1'	'9.64'	'5.4979'	'5.4526'	'0.0984'
$\lambda_{qf}$	'0.0301'	'0.4201'	'0.2947'	'0.2237'	'0.1398'
$\delta$	'0.0285'	'0.15'	'0.0581'	'0.1494'	'0.2734'
$\eta_L$	'0'	'0.96'	'0.5513'	'0.7888'	'0.1646'
$\vartheta_P$	'0.0025'	'0.0108'	'0.0001'	'0.0031'	'0.088'
$\gamma_H$	'0.2173'	'1'	'0.5017'	'0.7037'	'0.2136'
$z$	'0.0211'	'0.2084'	'0.3253'	'0.0961'	'0.1272'
$\eta_{\vartheta}$	'0.4775'	'0.6631'	'0.3912'	'0.5897'	'0.1456'
$a_L$	'1.5574'	'1.9157'	'2.2427'	'1.5947'	'0.1677'
$b_L$	'13.0972'	'15'	'13.0007'	'14.9497'	'0.177'
$a_{\mu}$	'4.7276'	'14.1849'	'8.1926'	'14.1347'	'0.2107'
$b_{\mu}$	'1.2688'	'14.44'	'5.616'	'10.4413'	'0.1636'
$\mu$	'0'	'0.0954'	'0.0461'	'0.0538'	'0.1337'
$a_H$	'1'	'10.4354'	'13.316'	'1.6797'	'0.2239'
$b_H$	'4.8257'	'15'	'8.1989'	'12.713'	'0.0986'
$\nu$	'83.4687'	'481'	'363.0604'	'224.5183'	'0.1296'
BP	'300.4613'	'303.623'	'304.4999'	'300.5'	'0.1383'

### 8.3. Identifiability analysys



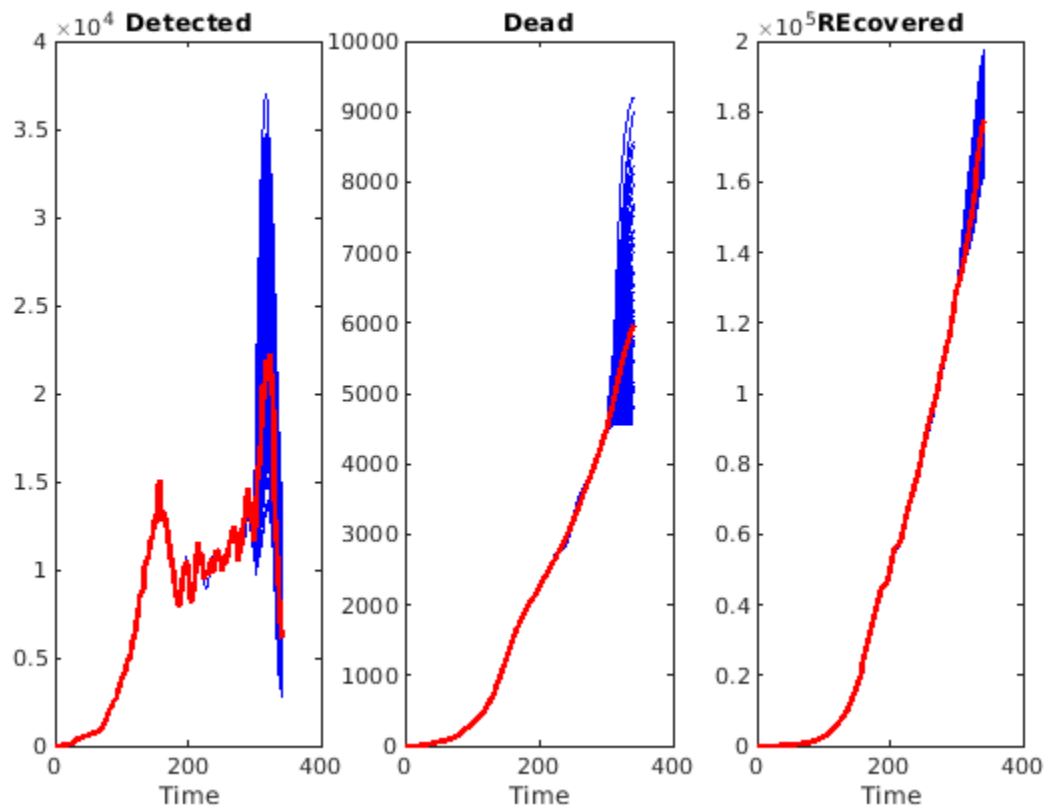






## 8.4. Uncertainty analysys

N=500



---

## Chapter 9. Extension number9

### 9.1. Basic information

The extension to be validated consists of the time series from the data343 to the 390. The status of the validation is: COMPLETED.

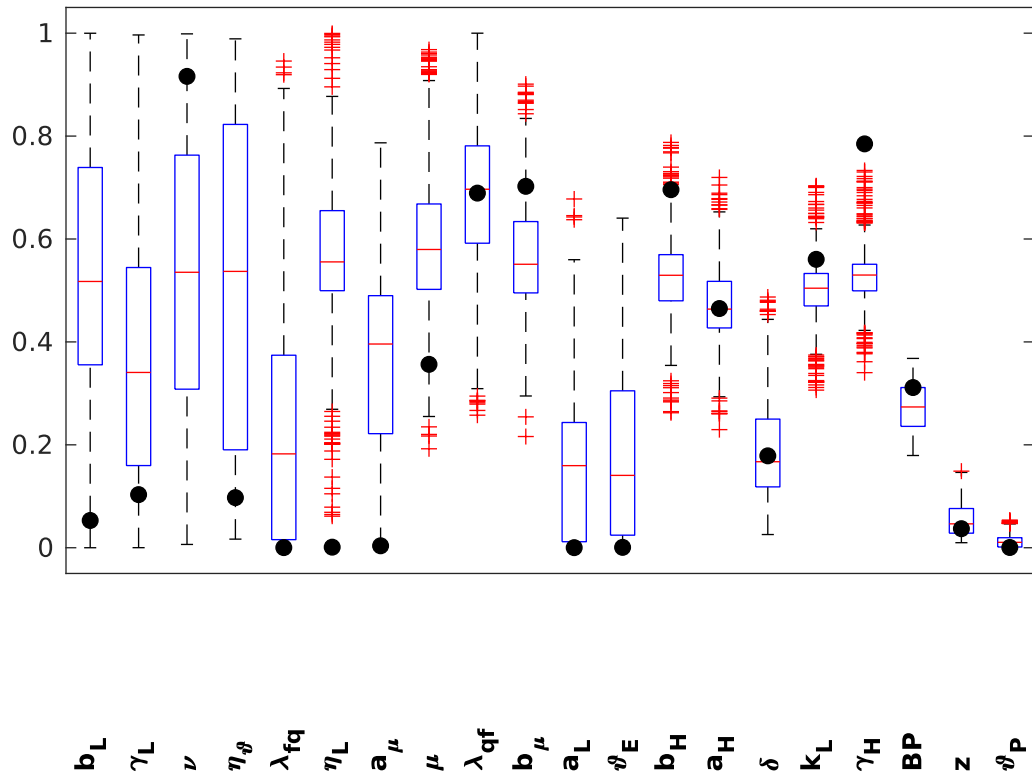
The number of estimations needed to perform the validation was1000.

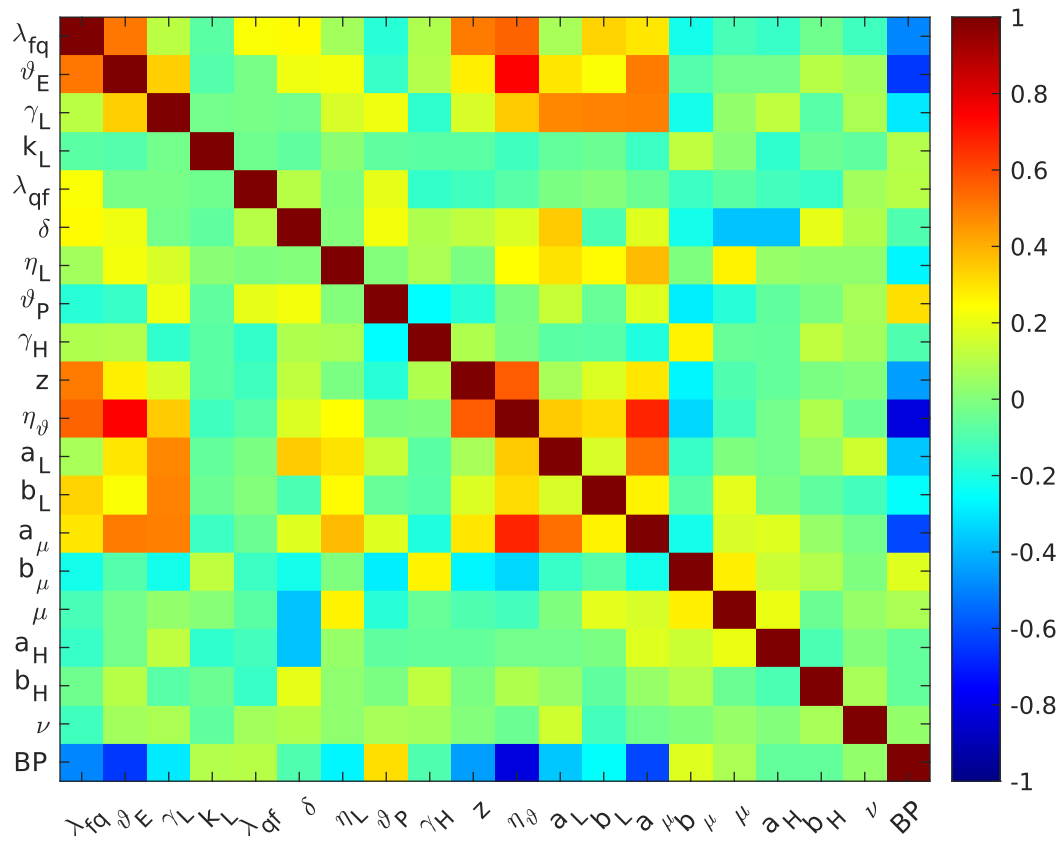
### 9.2. Estimated parameters with their intervals

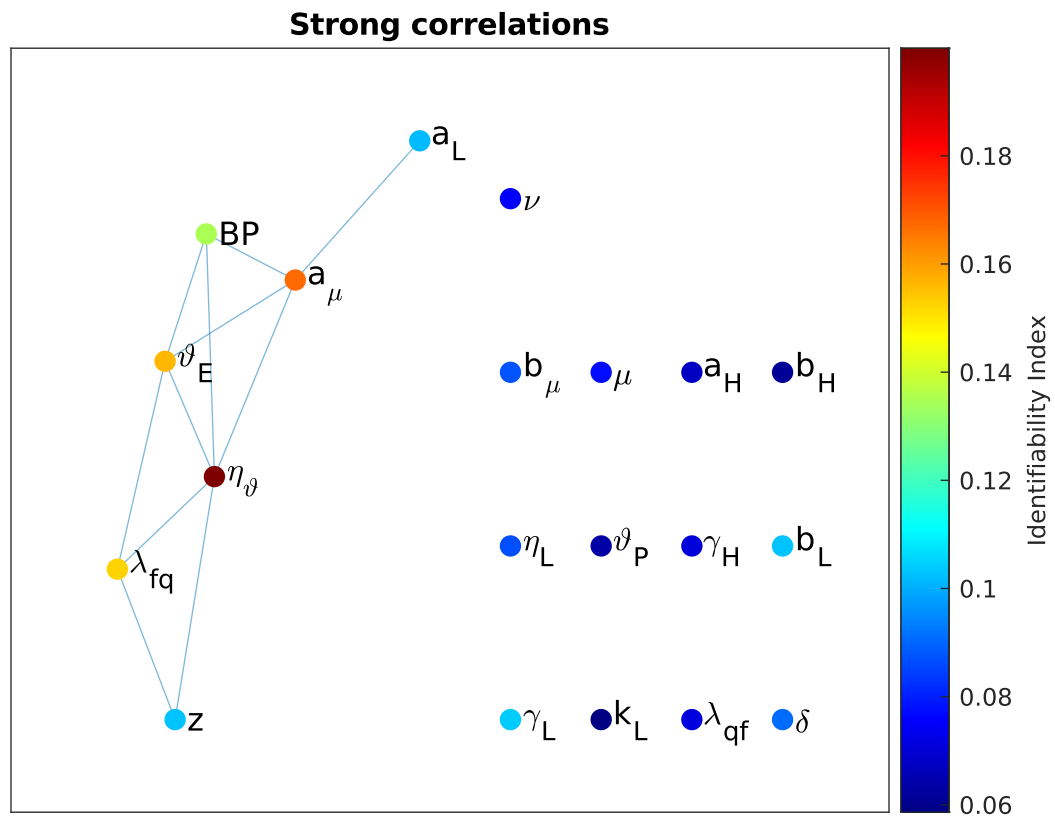
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.1473'	'0.2176'	'0.1824'	'0.0003'	'0.1527'
$\vartheta_E$	'0.1175'	'0.1637'	'0.1406'	'0.0007'	'0.1565'
$\gamma_L$	'0.3102'	'0.3711'	'0.3406'	'0.1032'	'0.104'
$k_L$	'5.3932'	'5.6857'	'5.5394'	'6.0443'	'0.0586'
$\lambda_{qf}$	'0.6715'	'0.7219'	'0.6967'	'0.6892'	'0.0715'
$\delta$	'0.0213'	'0.0289'	'0.0251'	'0.0268'	'0.091'
$\eta_L$	'0.5236'	'0.5874'	'0.5555'	'0.0011'	'0.0869'
$\vartheta_P$	'0.0064'	'0.0146'	'0.0105'	'0.0005'	'0.0637'
$\gamma_H$	'0.5104'	'0.5495'	'0.53'	'0.7849'	'0.071'
$z$	'1.1192'	'1.6654'	'1.3923'	'1.1105'	'0.1033'
$\eta_{\vartheta}$	'0.495'	'0.5791'	'0.537'	'0.0973'	'0.1999'
$a_L$	'2.9653'	'3.502'	'3.2337'	'1.0022'	'0.1021'
$b_L$	'7.7174'	'8.772'	'8.2447'	'1.7418'	'0.1032'
$a_{\mu}$	'6.2026'	'6.8827'	'6.5427'	'1.053'	'0.1671'
$b_{\mu}$	'8.416'	'9.0092'	'8.7126'	'10.8331'	'0.0874'
$\mu$	'0.5563'	'0.603'	'0.5796'	'0.3564'	'0.0779'
$a_H$	'7.2317'	'7.7533'	'7.4925'	'7.5083'	'0.0679'
$b_H$	'8.1477'	'8.6781'	'8.4129'	'10.7416'	'0.0615'
$\nu$	'249.7049'	'285.6302'	'267.6676'	'458.0285'	'0.0757'
BP	'341.1528'	'341.8471'	'341.5'	'343.5'	'0.1353'

### 9.3. Identifiability analysis

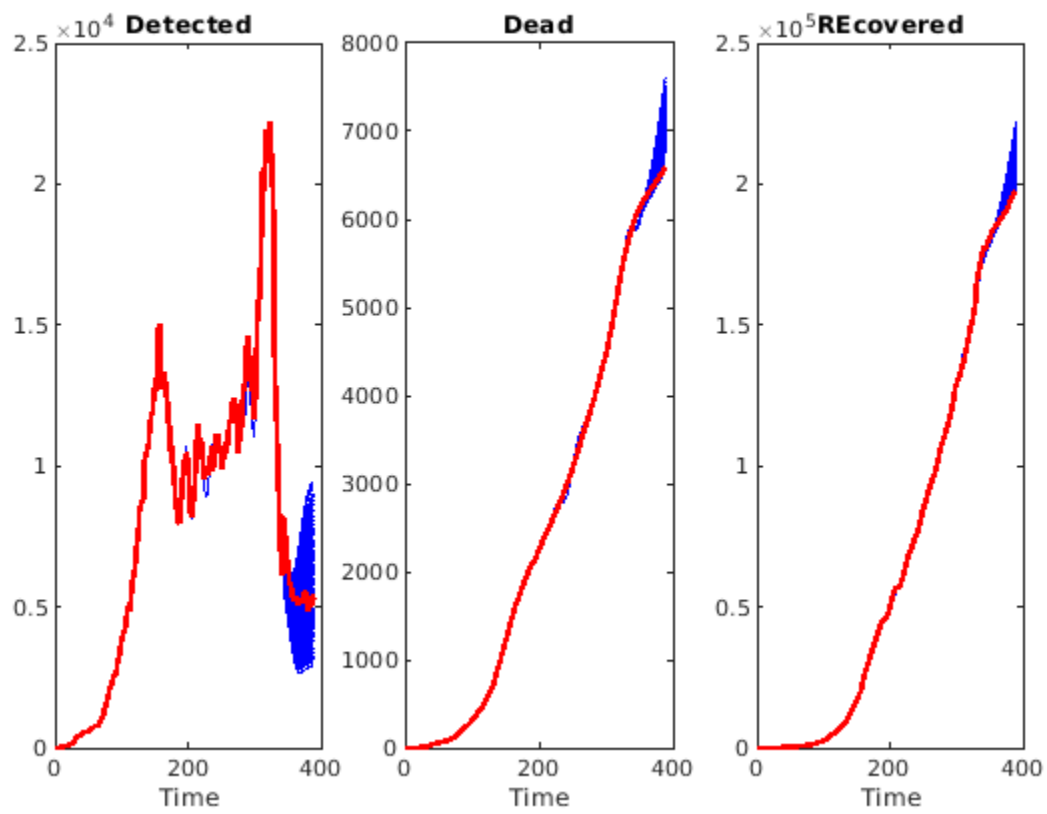






## 9.4. Uncertainty analysis

N=500





---

## Chapter 10. Extension number10

### 10.1. Basic information

The extension to be validated consists of the time series from the data390 to the 441. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

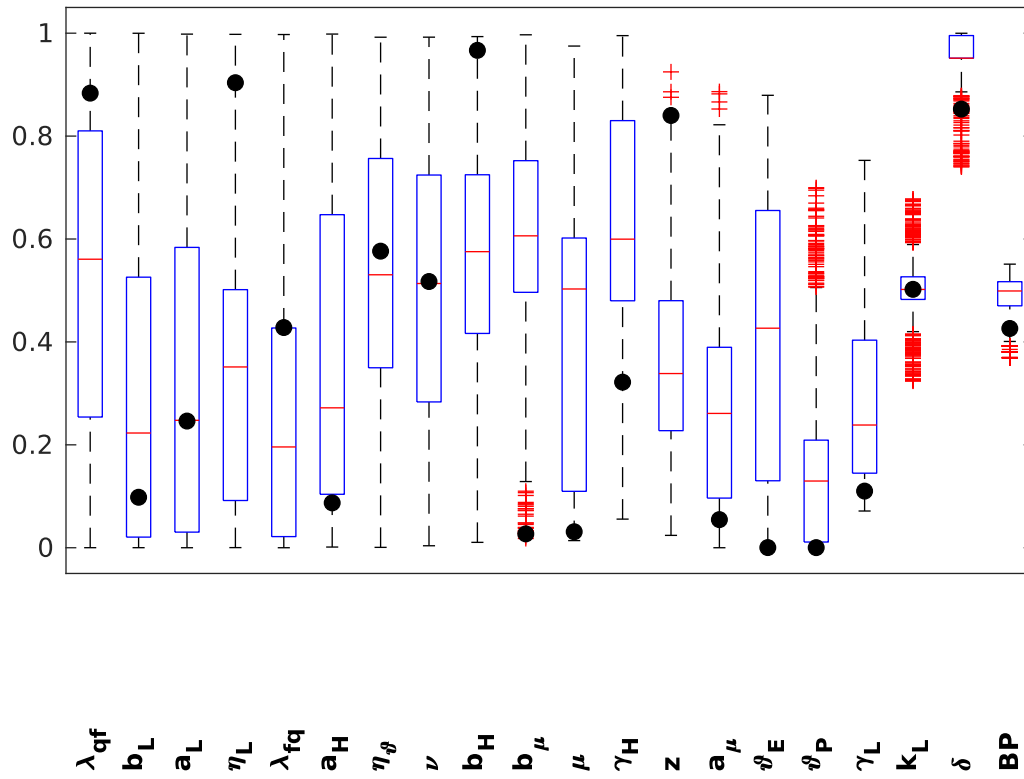
### 10.2. Estimated parameters with their intervals

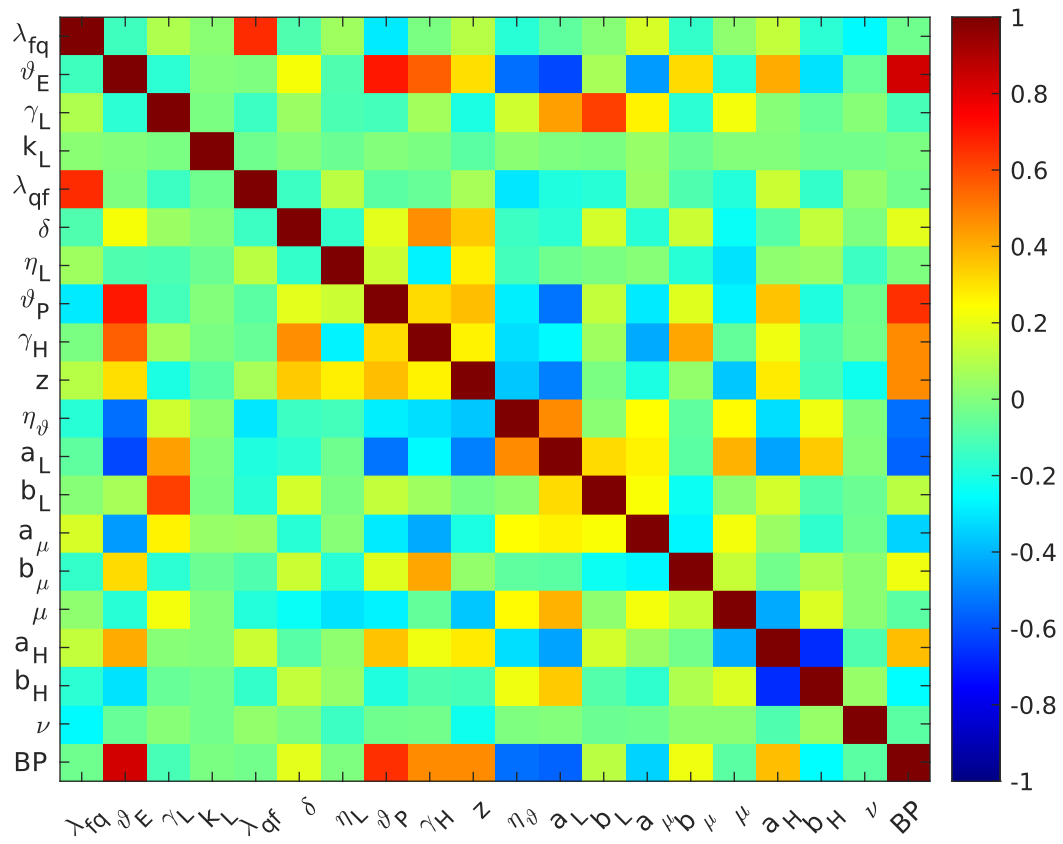
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

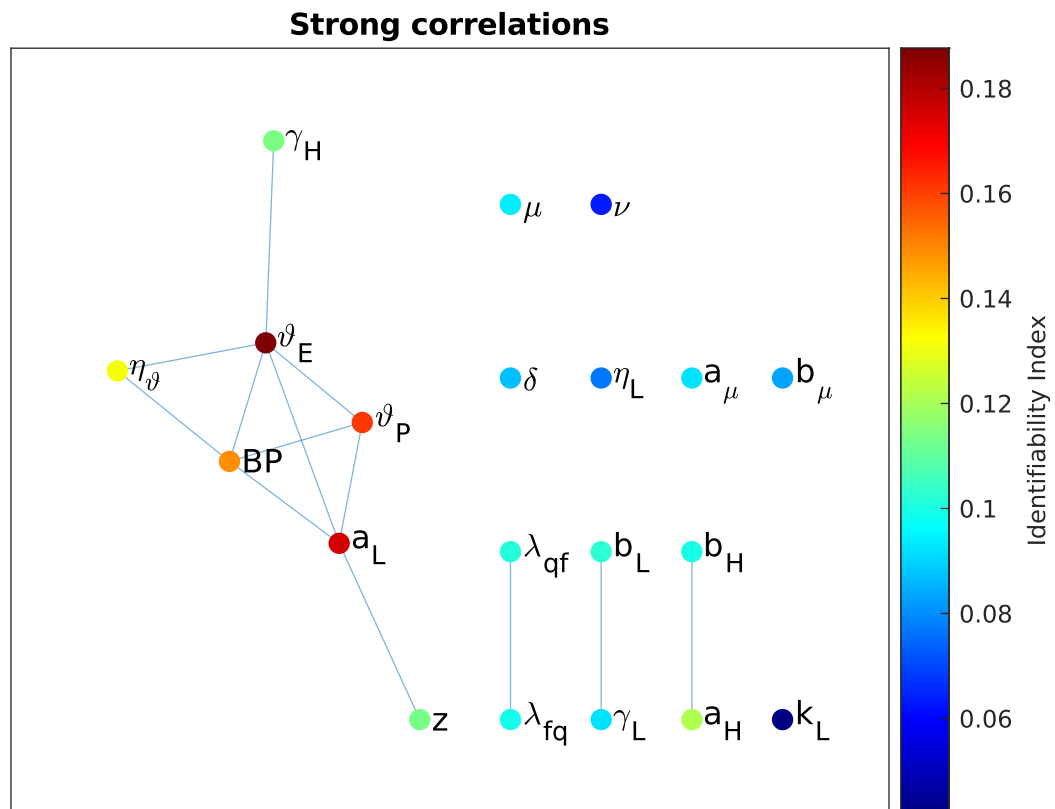
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.3702'	'0.4563'	'0.1959'	'0.428'	'0.0992'
$\vartheta_E$	'0.0001'	'0.0006'	'0.4267'	'0.0003'	'0.1877'
$\gamma_L$	'0.0594'	'0.1162'	'0.2385'	'0.1101'	'0.0922'
$k_L$	'1.1517'	'7.0697'	'5.5179'	'5.5198'	'0.0421'
$\lambda_{qf}$	'0.7333'	'0.925'	'0.5607'	'0.8835'	'0.1017'
$\delta$	'0.0927'	'0.1343'	'0.1427'	'0.1279'	'0.0875'
$\eta_L$	'0.2127'	'0.9504'	'0.3513'	'0.9038'	'0.0769'
$\vartheta_P$	'0.0002'	'0.0004'	'0.1296'	'0.0002'	'0.161'
$\gamma_H$	'0.191'	'0.4944'	'0.5997'	'0.3218'	'0.1142'
$z$	'17.3739'	'30'	'10.1558'	'25.2028'	'0.1138'
$\eta_{\vartheta}$	'0.5536'	'0.6141'	'0.5305'	'0.5764'	'0.1313'
$a_L$	'4.1936'	'7.6735'	'4.4668'	'4.4466'	'0.1752'
$b_L$	'2.3066'	'5.9275'	'4.1215'	'2.3733'	'0.1029'
$a_{\mu}$	'1.5919'	'9.6555'	'4.6545'	'1.7647'	'0.0926'
$b_{\mu}$	'1.1892'	'9.9946'	'9.4863'	'1.3771'	'0.0832'
$\mu$	'0.0032'	'0.0619'	'0.5029'	'0.0311'	'0.0944'
$a_H$	'2.1113'	'4.3012'	'4.8066'	'2.221'	'0.1217'
$b_H$	'6.2194'	'15'	'9.0558'	'14.5333'	'0.0998'
$\nu$	'255.3668'	'328.4093'	'256.7622'	'258.6971'	'0.0641'
BP	'379.7976'	'383.9598'	'386.9125'	'380.5'	'0.1485'

### 10.3. Identifiability analysis

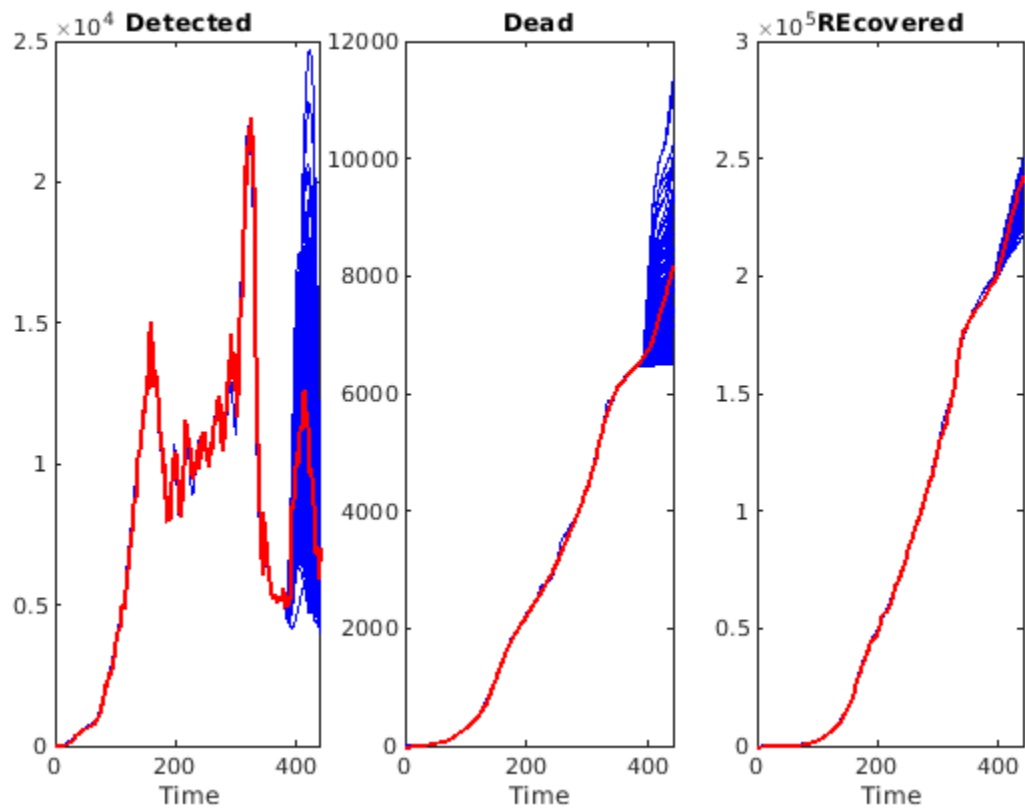






## 10.4. Uncertainty analysys

N=500



---

## Chapter 11. Extension number11

### 11.1. Basic information

The extension to be validated consists of the time series from the data441 to the 474. The status of the validation is: COMPLETED.

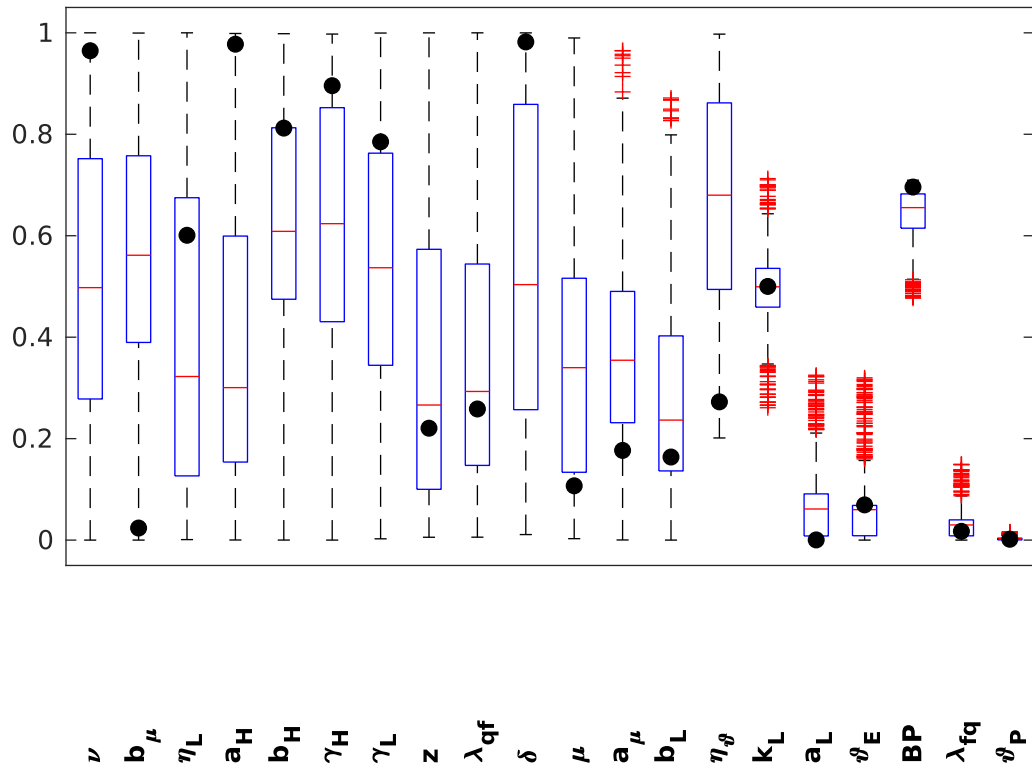
The number of estimations needed to perform the validation was1000.

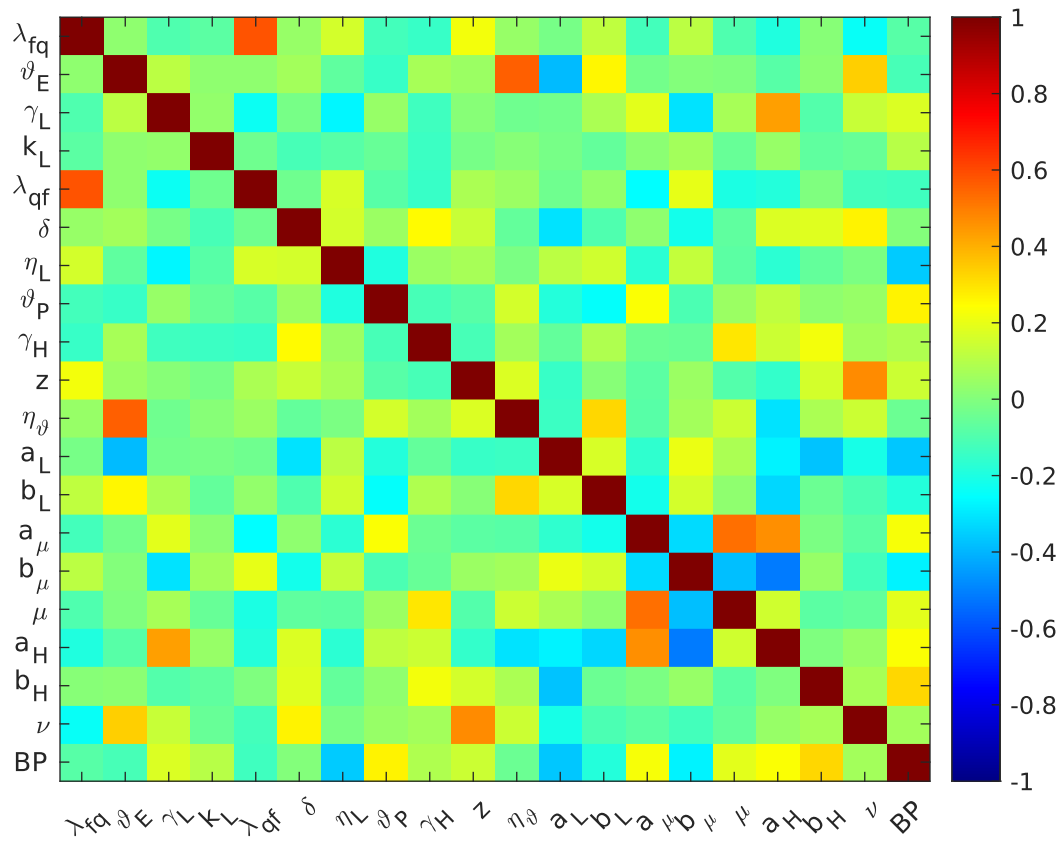
### 11.2. Estimated parameters with their intervals

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

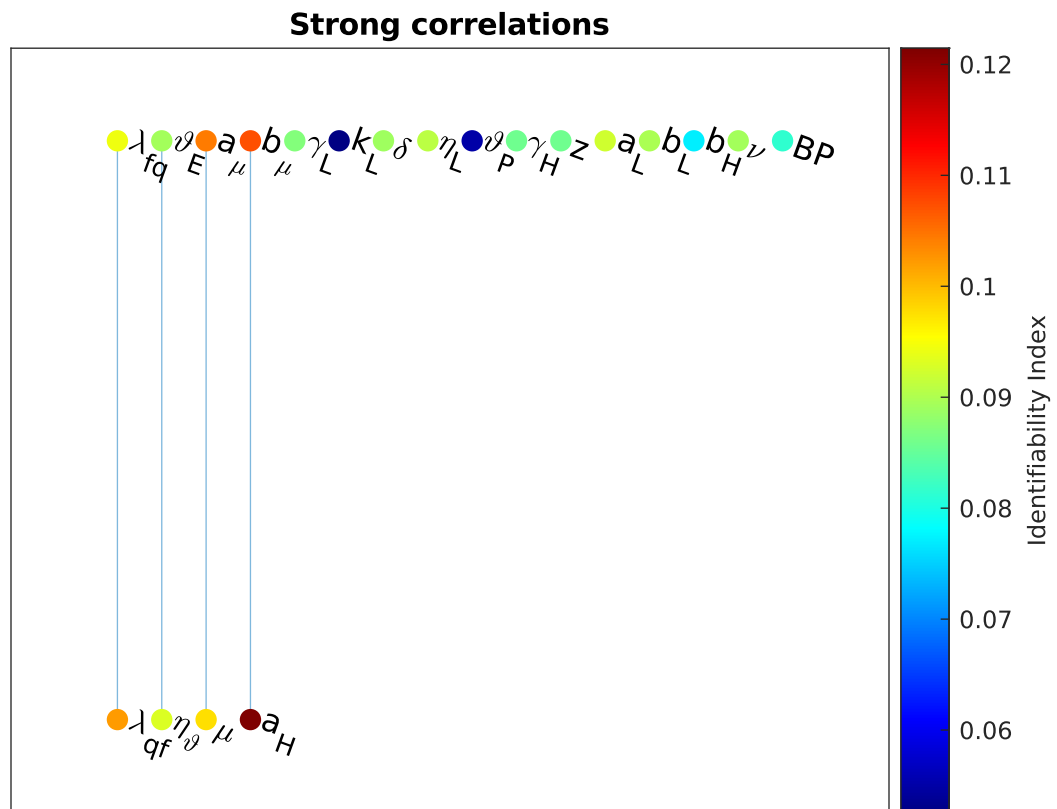
	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0043'	'0.0555'	'0.0299'	'0.0173'	'0.0944'
\vartheta_E	'0.0383'	'0.0818'	'0.0601'	'0.0694'	'0.0894'
\gamma_L	'0.5061'	'0.5677'	'0.5369'	'0.7852'	'0.087'
k_L	'5.365'	'5.6225'	'5.4938'	'5.5008'	'0.0526'
\lambda_{qf}	'0.261'	'0.325'	'0.293'	'0.2585'	'0.1022'
\delta	'0.0703'	'0.0808'	'0.0755'	'0.1473'	'0.089'
\eta_L	'0.2873'	'0.3577'	'0.3225'	'0.6009'	'0.091'
\vartheta_P	'0.0017'	'0.0044'	'0.0031'	'0.0017'	'0.0553'
\gamma_H	'0.5916'	'0.6559'	'0.6238'	'0.8958'	'0.0858'
z	'7.0047'	'8.972'	'7.9884'	'6.6175'	'0.0859'
\eta_{\vartheta}	'0.6556'	'0.7043'	'0.68'	'0.2725'	'0.0932'
a_L	'1.4968'	'2.2304'	'1.8636'	'1.0052'	'0.0923'
b_L	'3.8811'	'4.7438'	'4.3124'	'3.2928'	'0.0898'
a_{\mu}	'5.6003'	'6.3325'	'5.9664'	'3.4751'	'0.1043'
b_{\mu}	'8.4717'	'9.2512'	'8.8614'	'1.3331'	'0.1072'
\mu	'0.3128'	'0.367'	'0.3399'	'0.107'	'0.0977'
a_H	'4.7382'	'5.6778'	'5.208'	'14.686'	'0.1215'
b_H	'9.1168'	'9.9245'	'9.5207'	'12.3703'	'0.0772'
\nu	'233.3291'	'264.3546'	'248.8419'	'482.3217'	'0.0892'
BP	'437.4574'	'439.5426'	'438.5'	'441.5'	'0.0815'

### 11.3. Identifiability analysis



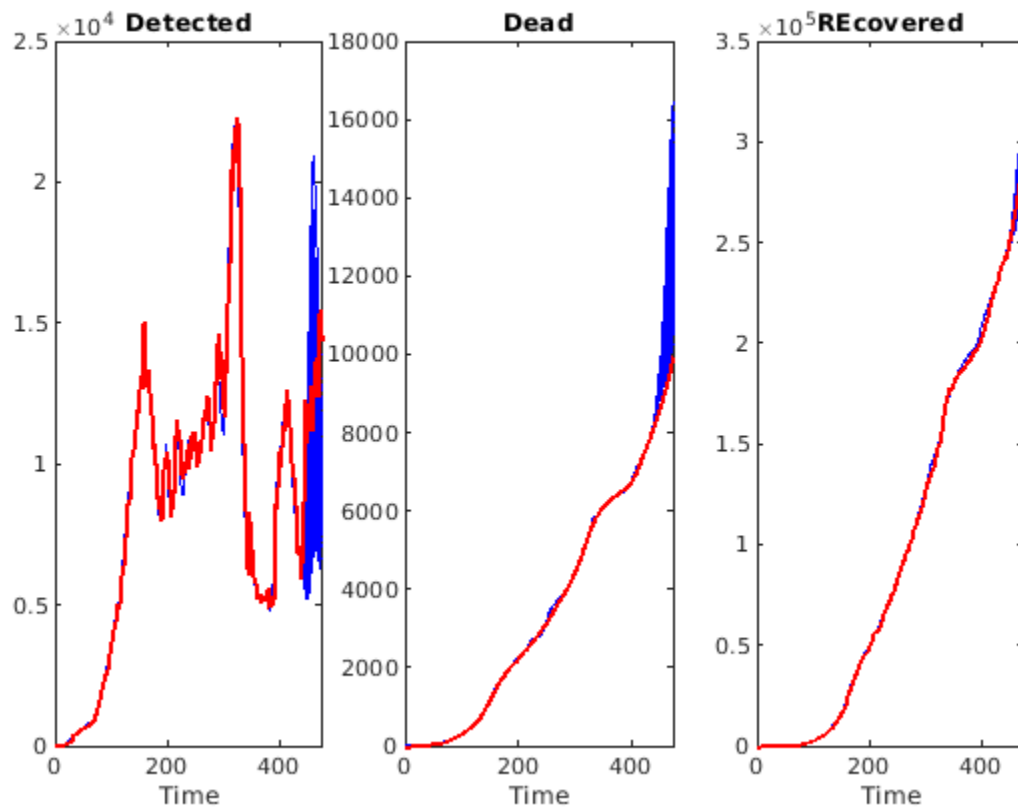






## 11.4. Uncertainty analysys

N=500



---

## Chapter 12. Extension number12

### 12.1. Basic information

The extension to be validated consists of the time series from the data474 to the 563. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

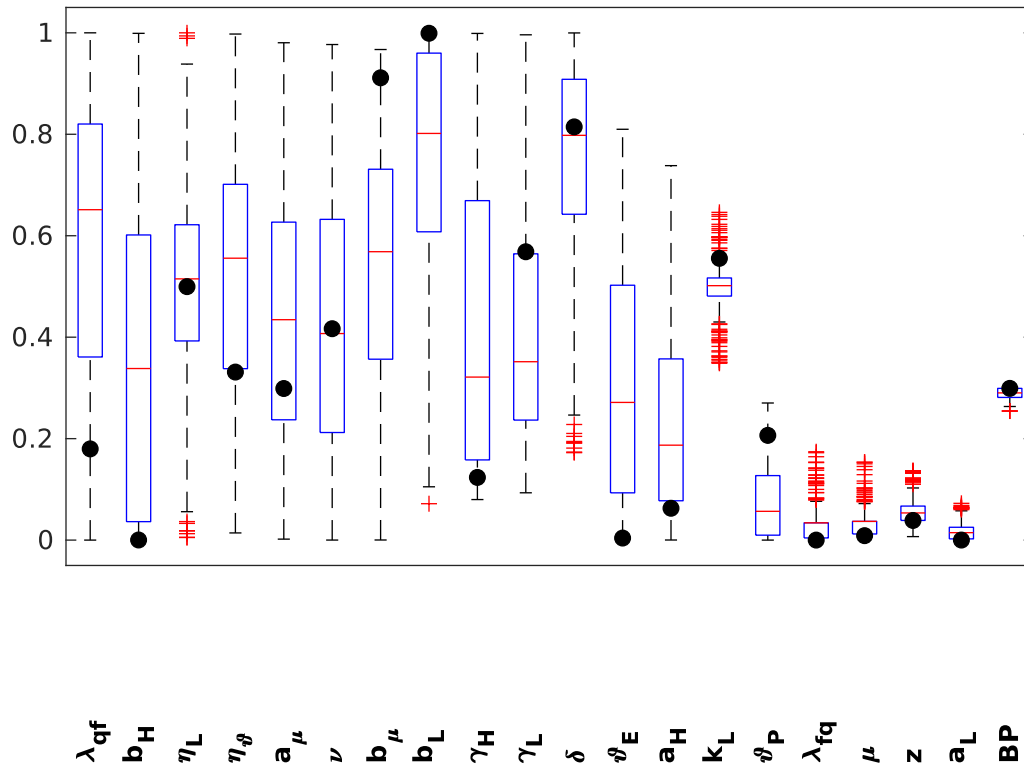
### 12.2. Estimated parameters with their intervals

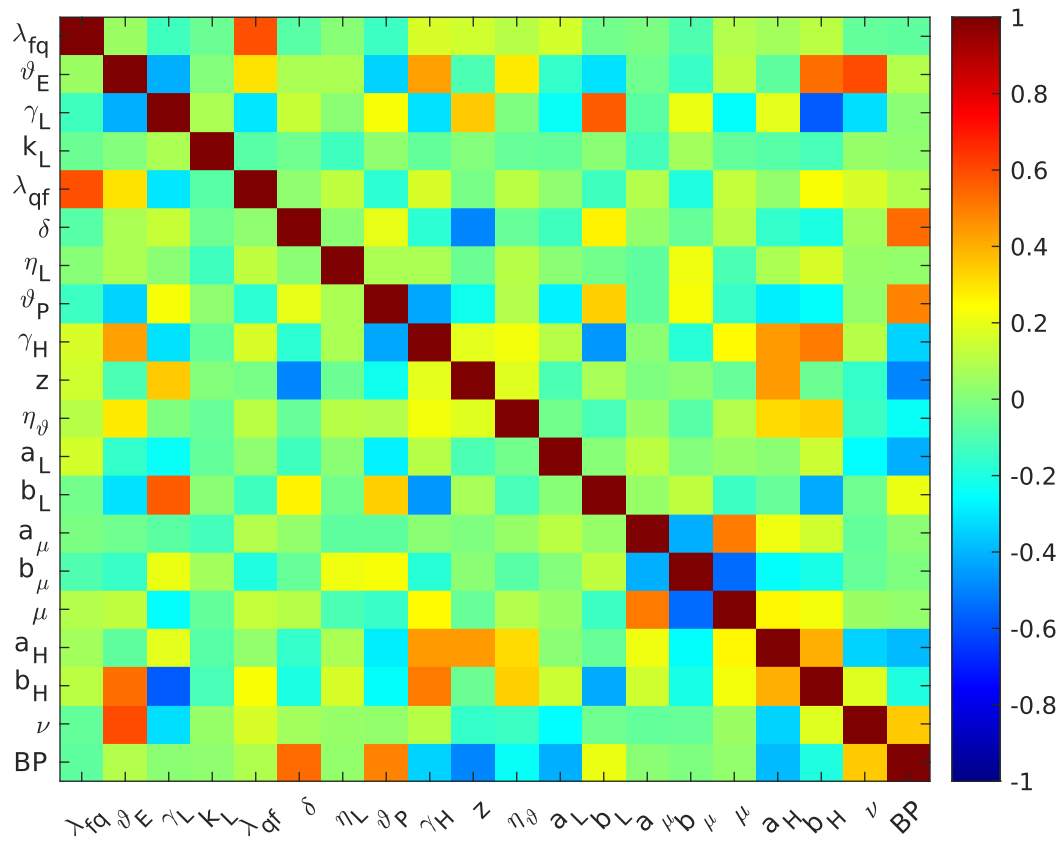
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

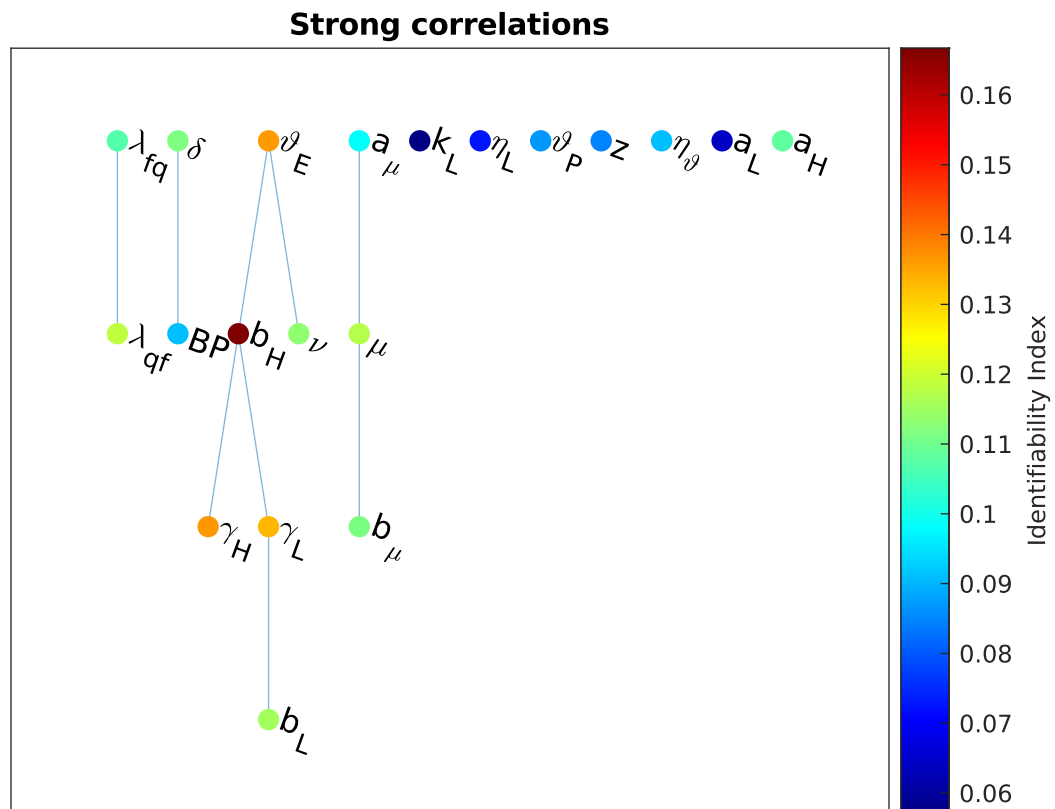
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0'	'0.0001'	'0.034'	'0'	'0.107'
$\vartheta_E$	'0'	'0.0091'	'0.2714'	'0.004'	'0.1361'
$\gamma_L$	'0.4003'	'0.6139'	'0.3516'	'0.5684'	'0.1333'
$k_L$	'1'	'10'	'5.514'	'5.9991'	'0.0573'
$\lambda_{qf}$	'0.0239'	'0.4045'	'0.6513'	'0.1798'	'0.1185'
$\delta$	'0.0492'	'0.15'	'0.1197'	'0.1222'	'0.1118'
$\eta_L$	'0.0876'	'1'	'0.5149'	'0.4996'	'0.0727'
$\vartheta_P$	'0.2046'	'0.3935'	'0.0567'	'0.2065'	'0.0869'
$\gamma_H$	'0.0765'	'0.2348'	'0.3214'	'0.1236'	'0.1367'
$z$	'1.1402'	'1.4824'	'1.6062'	'1.1621'	'0.0848'
$\eta_{\vartheta}$	'0.0913'	'0.7453'	'0.5557'	'0.3312'	'0.091'
$a_L$	'1'	'3.0273'	'1.2052'	'1.0011'	'0.0643'
$b_L$	'5.6155'	'15'	'12.2232'	'14.9877'	'0.1158'
$a_{\mu}$	'1'	'15'	'7.0827'	'5.1837'	'0.0984'
$b_{\mu}$	'1.28'	'15'	'8.9593'	'13.7587'	'0.1112'
$\mu$	'0'	'0.0197'	'0.0369'	'0.0087'	'0.1175'
$a_H$	'1.811'	'5.074'	'3.6198'	'1.8787'	'0.1085'
$b_H$	'1'	'7.2409'	'5.7352'	'1.0029'	'0.1667'
$\nu$	'122.826'	'213.4772'	'203.5807'	'208.3518'	'0.1134'
BP	'473.4874'	'483.2212'	'473.5'	'474.4999'	'0.0912'

### 12.3. Identifiability analysis

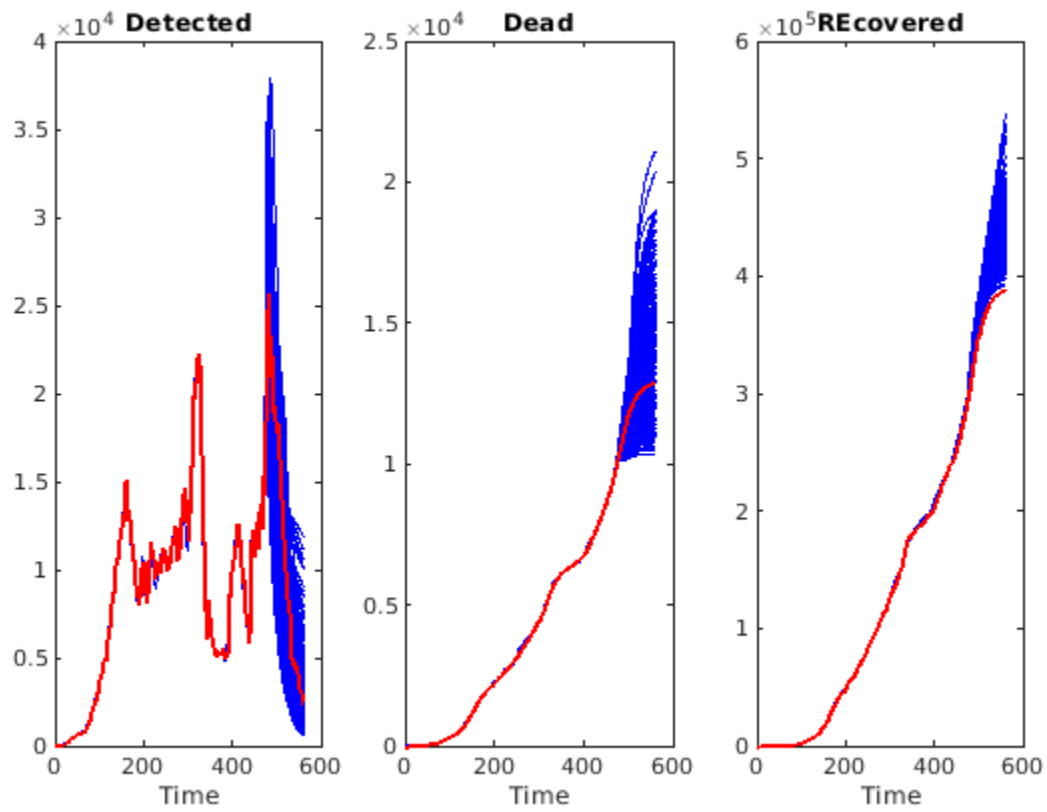






## 12.4. Uncertainty analysis

N=500



---

## Chapter 13. Extension number13

### 13.1. Basic information

The extension to be validated consists of the time series from the data563 to the 725. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was2000.

### 13.2. Estimated parameters with their intervals

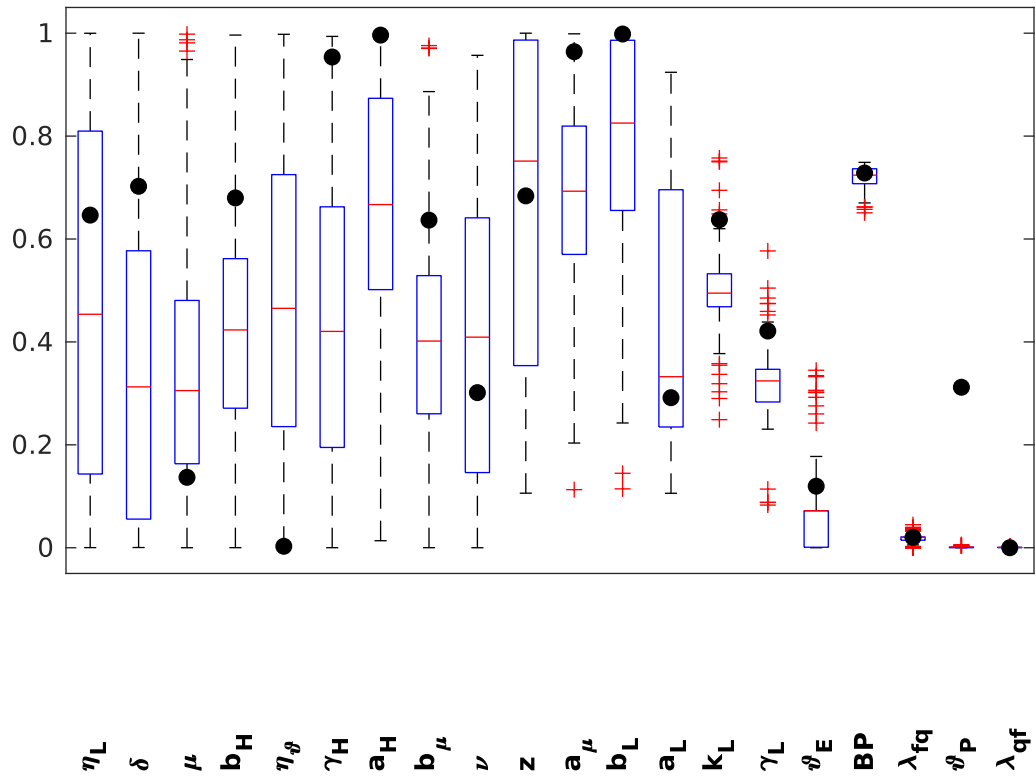
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

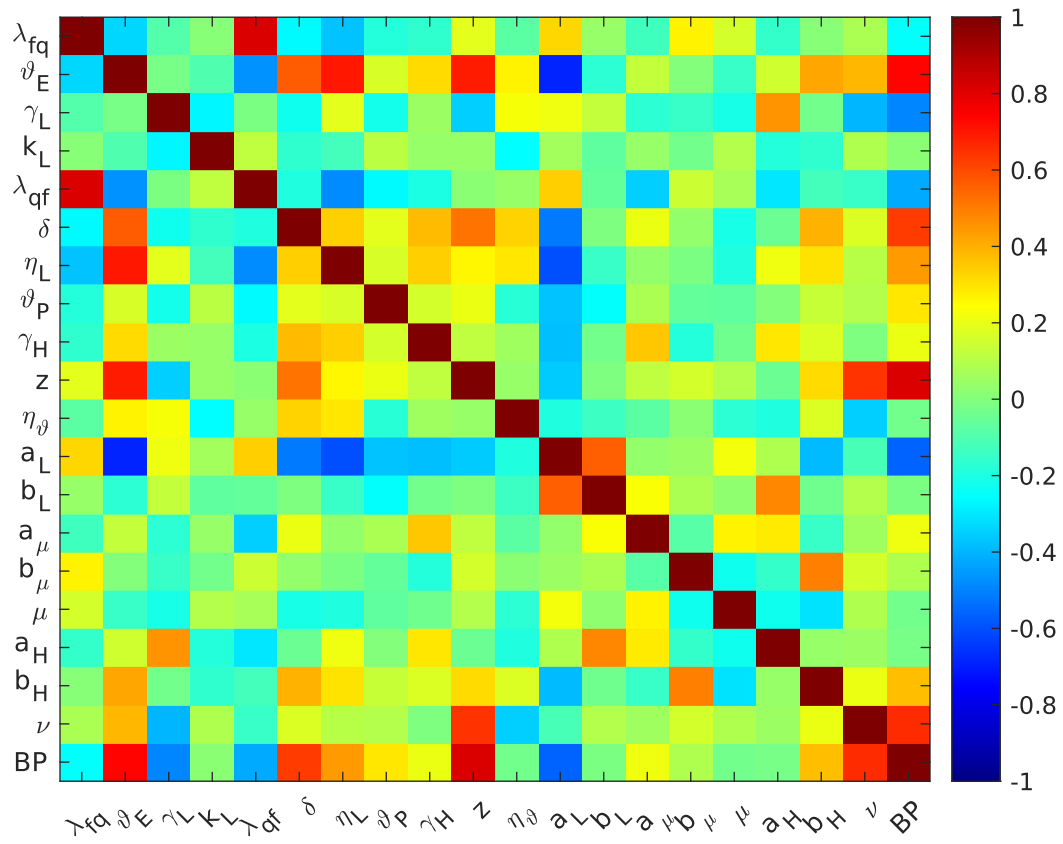
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

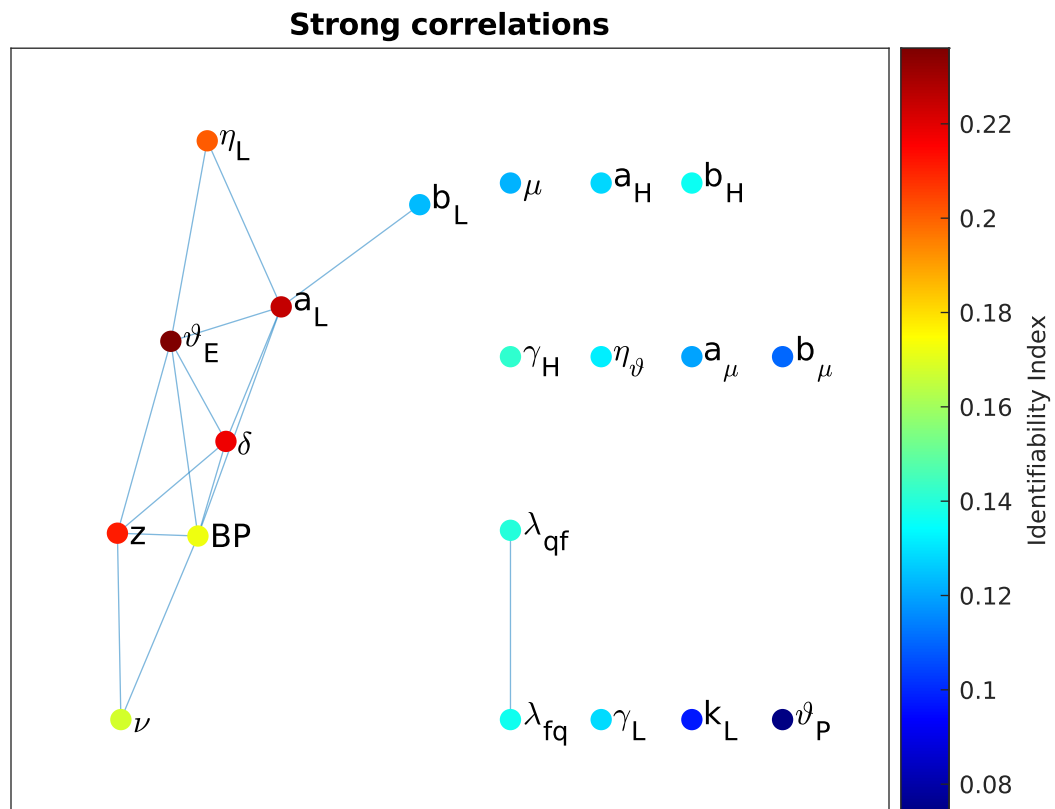
	Rango		Nominal	Mejor	Index
$\lambda_{fq}$	'0.0176'	'0.0241'	'0.0201'	'0.0202'	'0.1371'
$\vartheta_E$	'0.0108'	'0.2422'	'0.0718'	'0.1196'	'0.236'
$\gamma_L$	'0.2638'	'0.926'	'0.3242'	'0.4212'	'0.1286'
$k_L$	'1.45'	'10'	'5.4532'	'6.7383'	'0.0977'
$\lambda_{qf}$	'0'	'0.0001'	'0.0007'	'0'	'0.14'
$\delta$	'0'	'0.15'	'0.0469'	'0.1054'	'0.2181'
$\eta_L$	'0.025'	'0.9142'	'0.4537'	'0.6464'	'0.2012'
$\vartheta_P$	'0.11'	'0.4077'	'0.0013'	'0.3119'	'0.0741'
$\gamma_H$	'0.05'	'1'	'0.4204'	'0.9537'	'0.1418'
$z$	'18.428'	'23.1435'	'22.5427'	'20.5154'	'0.2111'
$\eta_{\vartheta}$	'0.0001'	'0.0061'	'0.4653'	'0.0029'	'0.132'
$a_L$	'4.4262'	'7.8419'	'5.6535'	'5.0828'	'0.225'
$b_L$	'7.9646'	'15'	'12.5545'	'14.977'	'0.1234'
$a_{\mu}$	'1'	'15'	'10.7005'	'14.4962'	'0.1199'
$b_{\mu}$	'1'	'15'	'6.623'	'9.9138'	'0.1104'
$\mu$	'0'	'0.2155'	'0.3054'	'0.1369'	'0.1226'
$a_H$	'2.4'	'15'	'10.3368'	'14.9477'	'0.1282'
$b_H$	'1.28'	'15'	'6.9261'	'10.5178'	'0.1362'
$\nu$	'150.3716'	'226.4574'	'204.6201'	'150.7154'	'0.168'
BP	'648.5626'	'651.1208'	'648.5'	'649.5'	'0.1726'



### 13.3. Identifiability analysis







### 13.4. Uncertainty analysis

