

Validation process for MANIZALES

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 134. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was 1000.

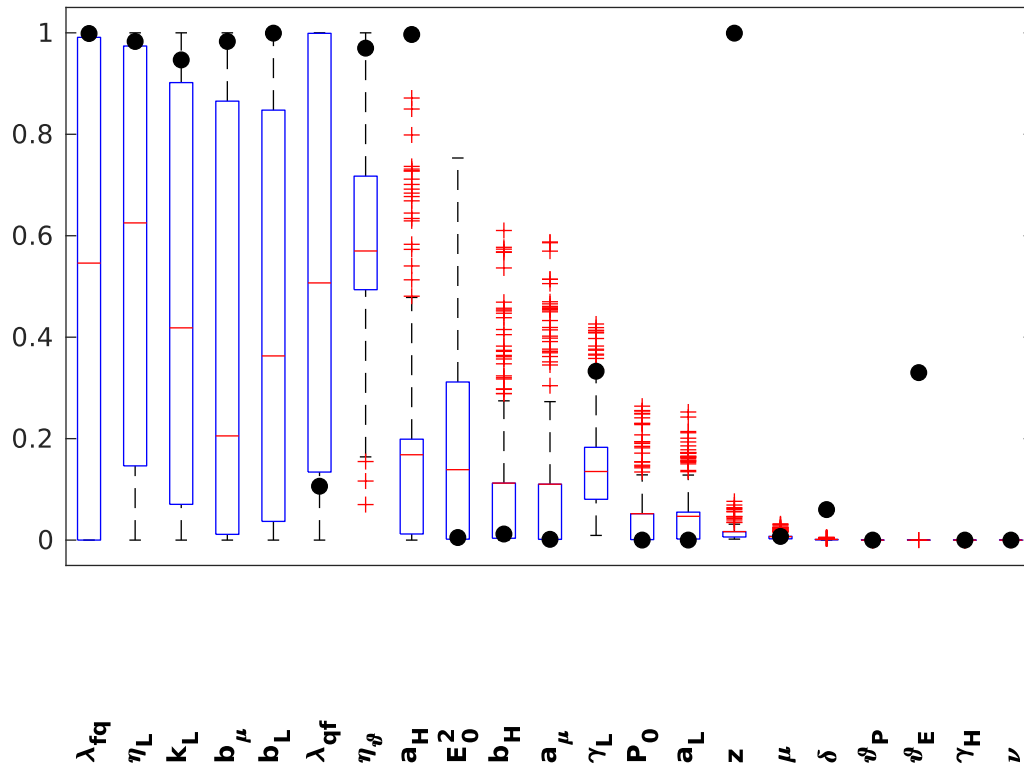
1.2. Estimated parameters with their intervals

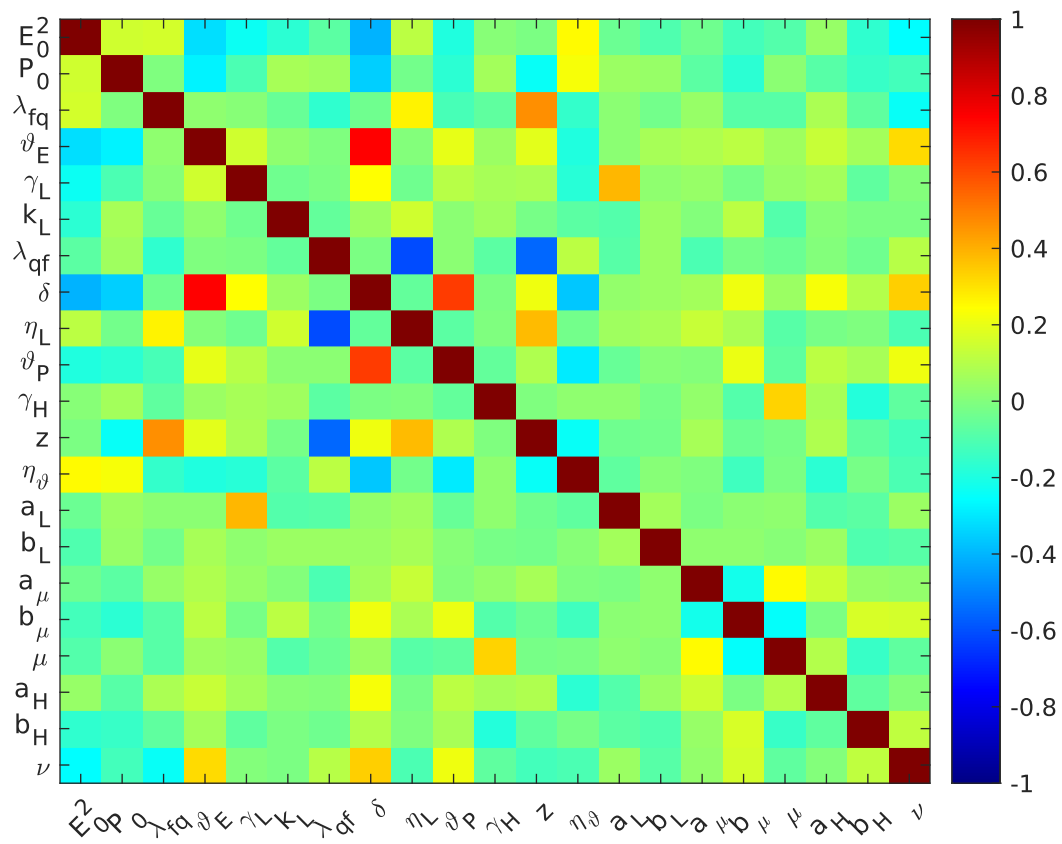
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

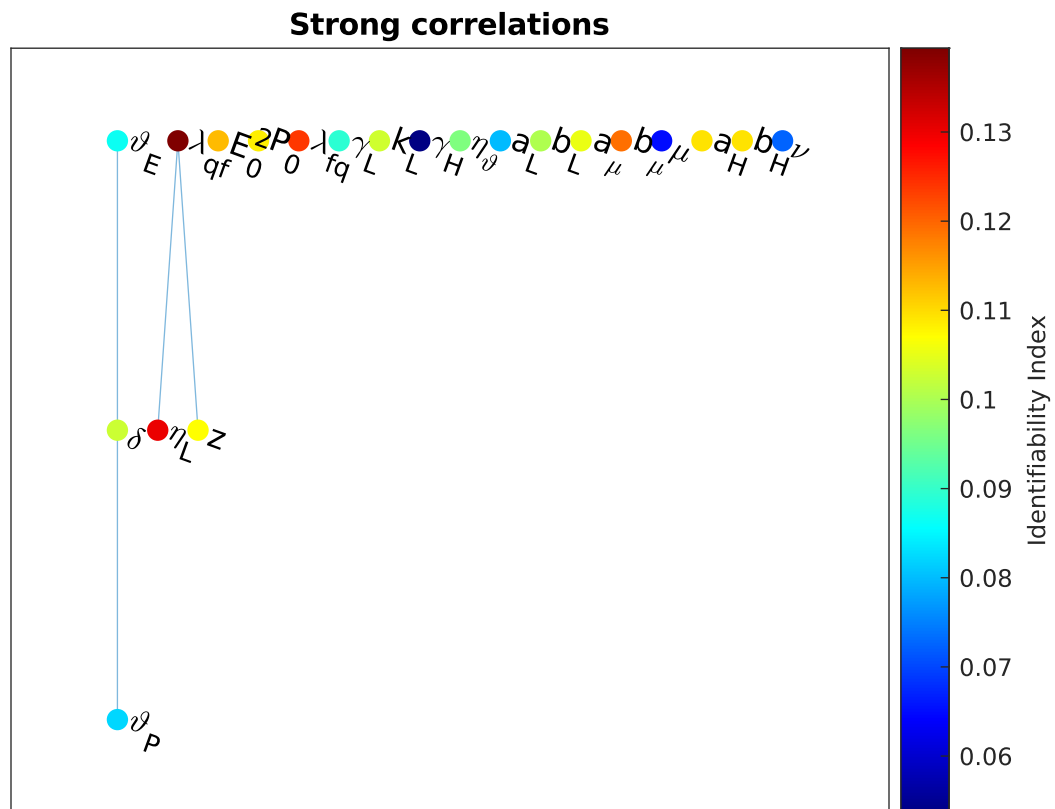
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|------------------|-----------|-----------|------------|-----------|----------|
| E^2_0 | '9.0258' | '11.6443' | '277.6458' | '10.1292' | '0.1129' |
| P_0 | '0.001' | '0.0414' | '20.8115' | '0.0194' | '0.1086' |
| \lambda_{fq} | '0.9726' | '1' | '0.5461' | '0.9987' | '0.1237' |
| \vartheta_E | '0.2652' | '0.3376' | '0' | '0.3302' | '0.0867' |
| \gamma_L | '0.3165' | '0.3331' | '0.1352' | '0.3329' | '0.0892' |
| k_L | '1' | '10' | '4.7656' | '9.5197' | '0.1032' |
| \lambda_{qf} | '0.1055' | '0.1084' | '0.507' | '0.1062' | '0.1394' |
| \delta | '0.0054' | '0.0101' | '0.0002' | '0.009' | '0.1029' |
| \eta_L | '0.9565' | '0.9934' | '0.6253' | '0.983' | '0.1302' |
| \vartheta_P | '0' | '0' | '0' | '0' | '0.0823' |
| \gamma_H | '0' | '0' | '0' | '0' | '0.0537' |
| z | '28.4621' | '30' | '0.5013' | '29.9802' | '0.1071' |
| \eta_{\vartheta} | '0.4695' | '1' | '0.5699' | '0.9698' | '0.0965' |
| a_L | '1' | '1.0859' | '1.6562' | '1.001' | '0.0798' |
| b_L | '13.8679' | '15' | '6.083' | '14.9908' | '0.1005' |
| a_{\mu} | '1' | '12.34' | '2.5435' | '1.0213' | '0.1053' |
| b_{\mu} | '3.0221' | '15' | '3.8755' | '14.7632' | '0.119' |
| \mu | '0.0004' | '0.0147' | '0.0068' | '0.0073' | '0.0654' |
| a_H | '2.715' | '15' | '3.3554' | '14.9541' | '0.1095' |
| b_H | '1' | '14.3' | '2.5729' | '1.168' | '0.1095' |
| \nu | '0' | '0.0005' | '0.0001' | '0.0002' | '0.0727' |

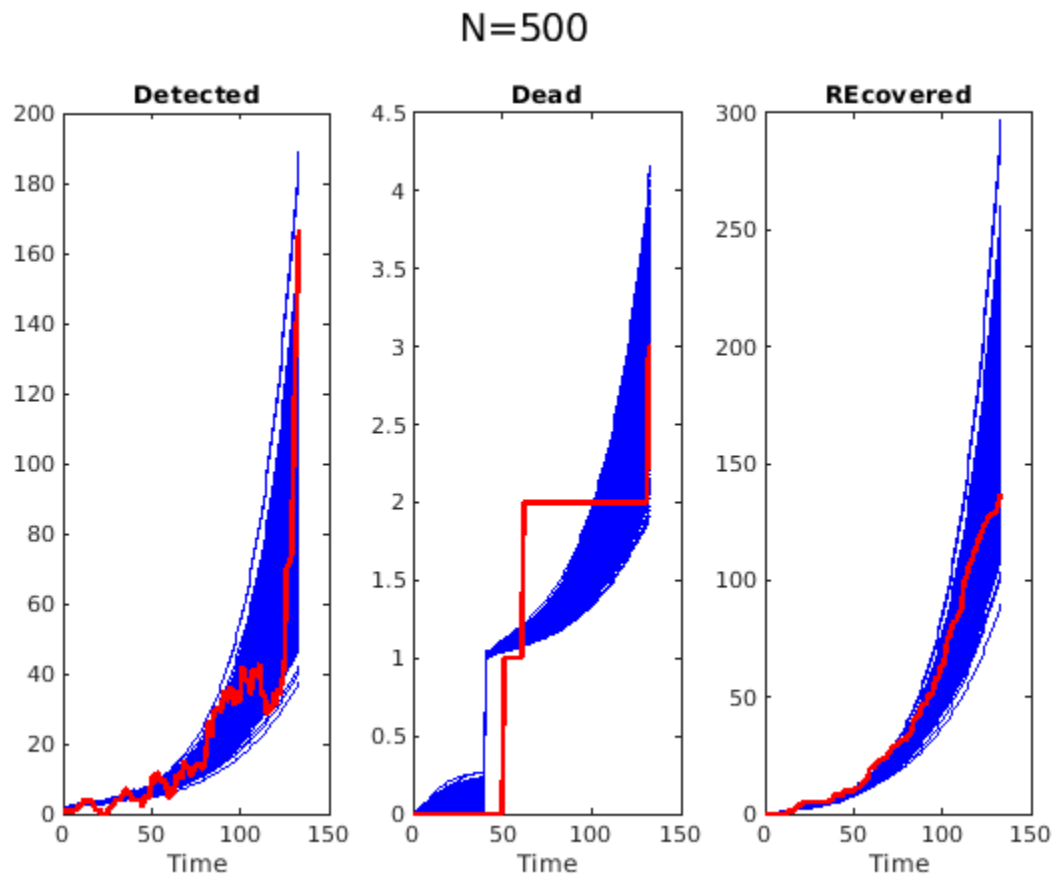
1.3. Identifiability analysys







1.4. Uncertainty analysis



Chapter 2. Extension number2

2.1. Basic information

The extension to be validated consists of the time series from the data134 to the 201. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

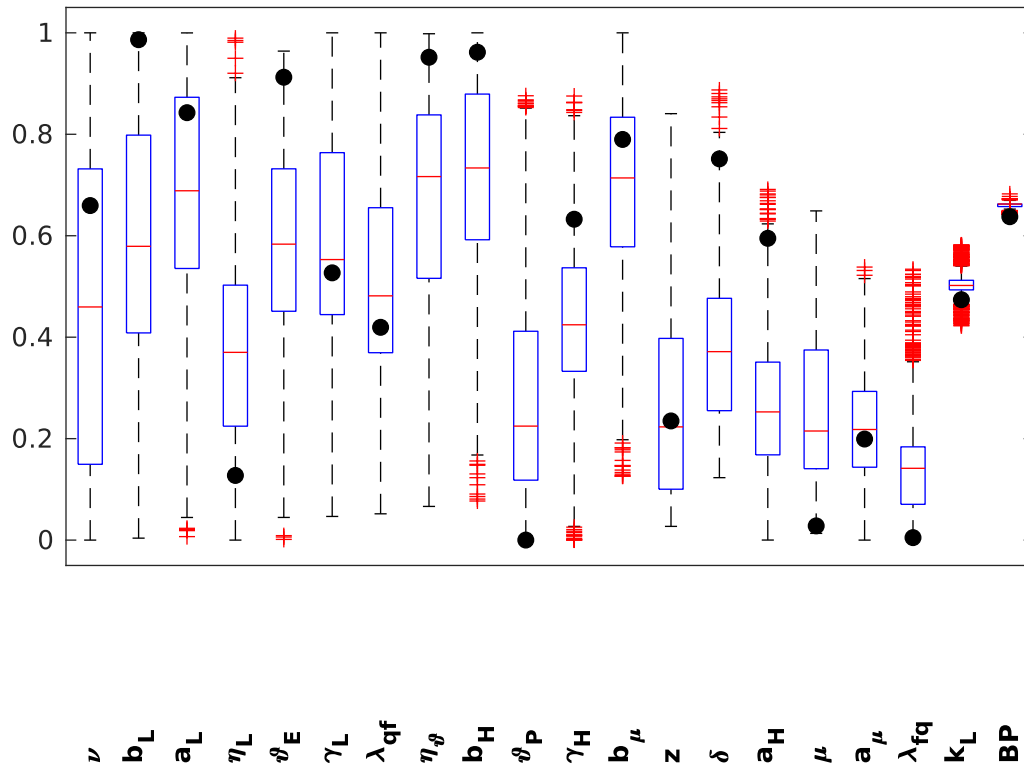
2.2. Estimated parameters with their intervals

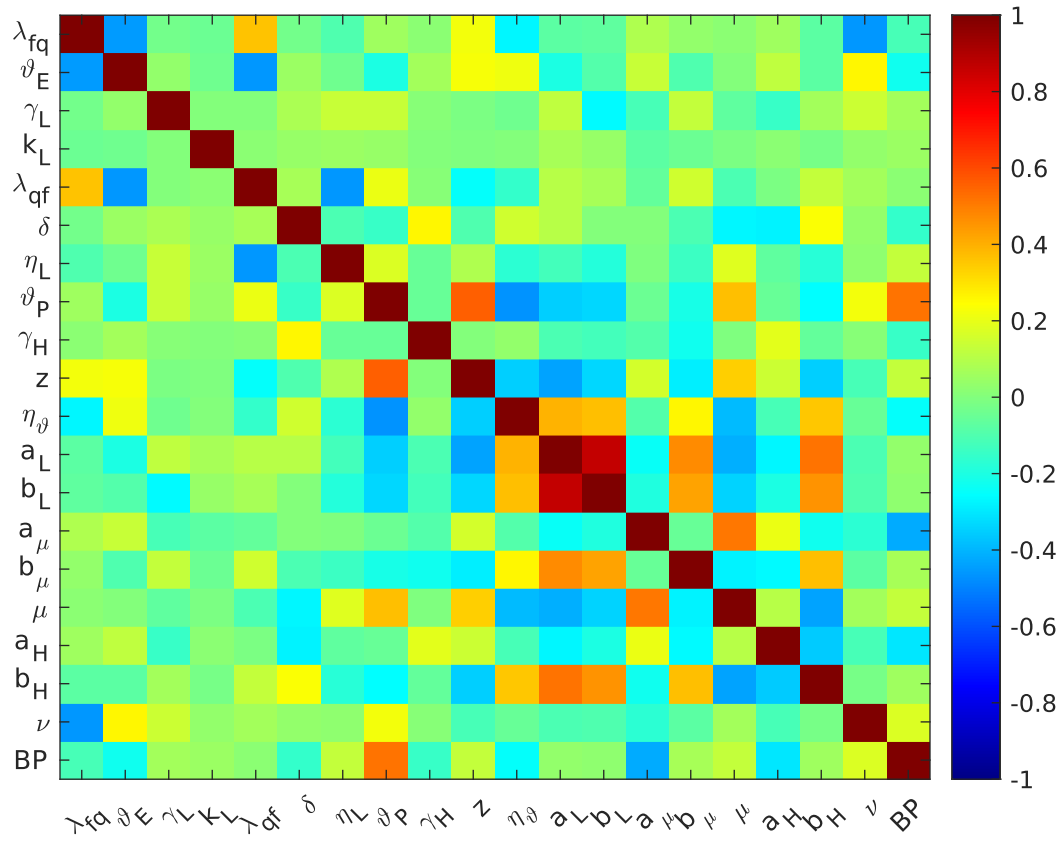
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

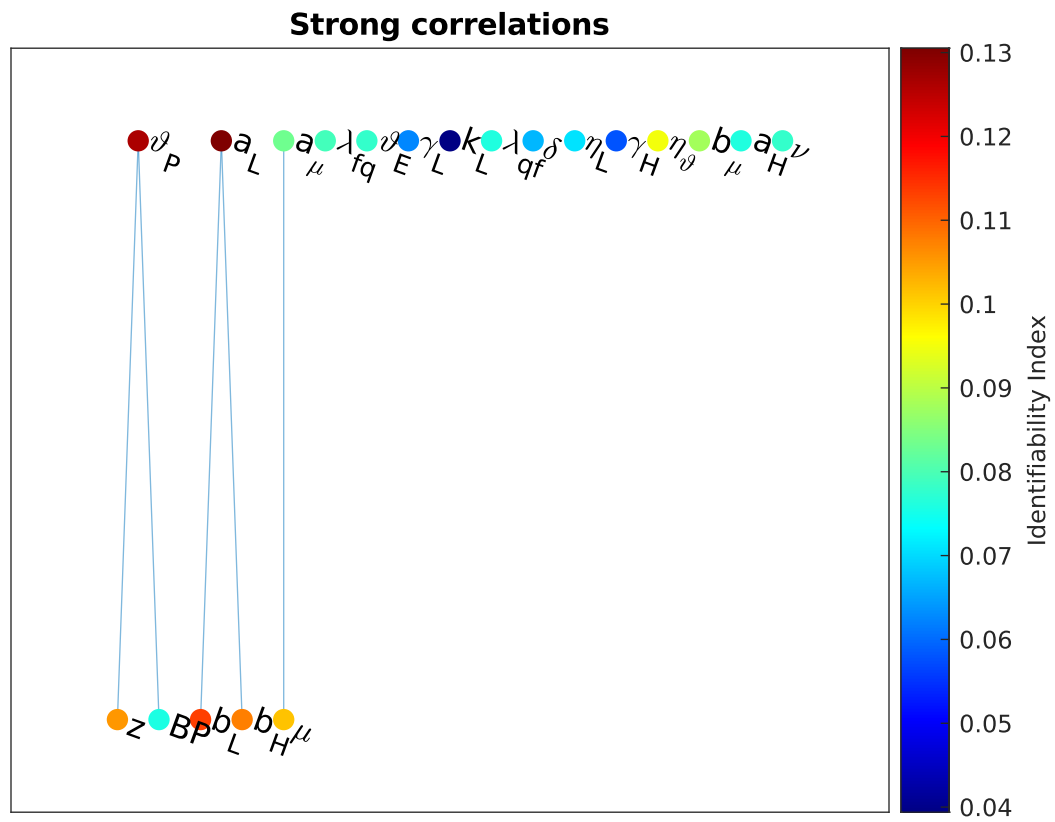
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|------------|----------|
| λ_{fq} | '0.0044' | '0.0086' | '0.1415' | '0.0049' | '0.0796' |
| ϑ_E | '0.9042' | '0.9125' | '0.5834' | '0.9125' | '0.0781' |
| γ_L | '0.2879' | '1' | '0.553' | '0.5269' | '0.0627' |
| k_L | '1' | '10' | '5.5178' | '5.265' | '0.0394' |
| λ_{qf} | '0.3339' | '0.4258' | '0.4815' | '0.4195' | '0.0764' |
| δ | '0.0843' | '0.1143' | '0.0557' | '0.1127' | '0.0669' |
| η_L | '0.1081' | '0.1299' | '0.3701' | '0.1274' | '0.0708' |
| ϑ_P | '0' | '0.0002' | '0.2247' | '0.0001' | '0.1266' |
| γ_H | '0.2367' | '0.9618' | '0.4245' | '0.6325' | '0.0579' |
| z | '6.7509' | '7.4375' | '6.6955' | '7.0471' | '0.1056' |
| η_{ϑ} | '0.2398' | '0.9696' | '0.7166' | '0.9518' | '0.0951' |
| a_L | '8.236' | '13.4566' | '10.6412' | '12.7962' | '0.1305' |
| b_L | '10.0516' | '15' | '9.1079' | '14.8104' | '0.1133' |
| a_{μ} | '1.6351' | '4.5811' | '4.0526' | '3.7891' | '0.0832' |
| b_{μ} | '7.5739' | '15' | '10.9951' | '12.0576' | '0.0879' |
| μ | '0.0251' | '0.0337' | '0.2151' | '0.028' | '0.1015' |
| a_H | '7.5479' | '15' | '4.5379' | '9.3289' | '0.0763' |
| b_H | '6.1193' | '15' | '11.2705' | '14.4648' | '0.1076' |
| ν | '20.025' | '450' | '229.7995' | '329.7447' | '0.0781' |
| BP | '127.2903' | '141.8055' | '133.5' | '128.5' | '0.076' |

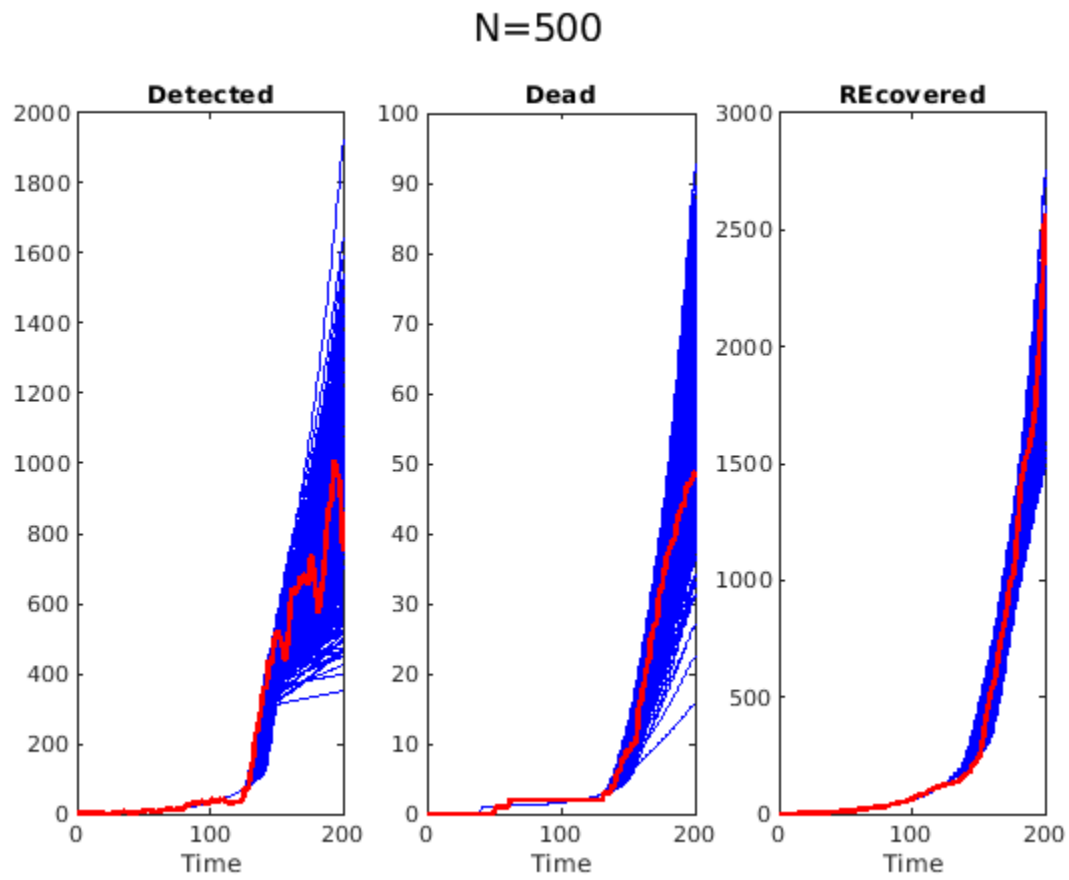
2.3. Identifiability analysys







2.4. Uncertainty analysys



Chapter 3. Extension number3

3.1. Basic information

The extension to be validated consists of the time series from the data201 to the 239. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

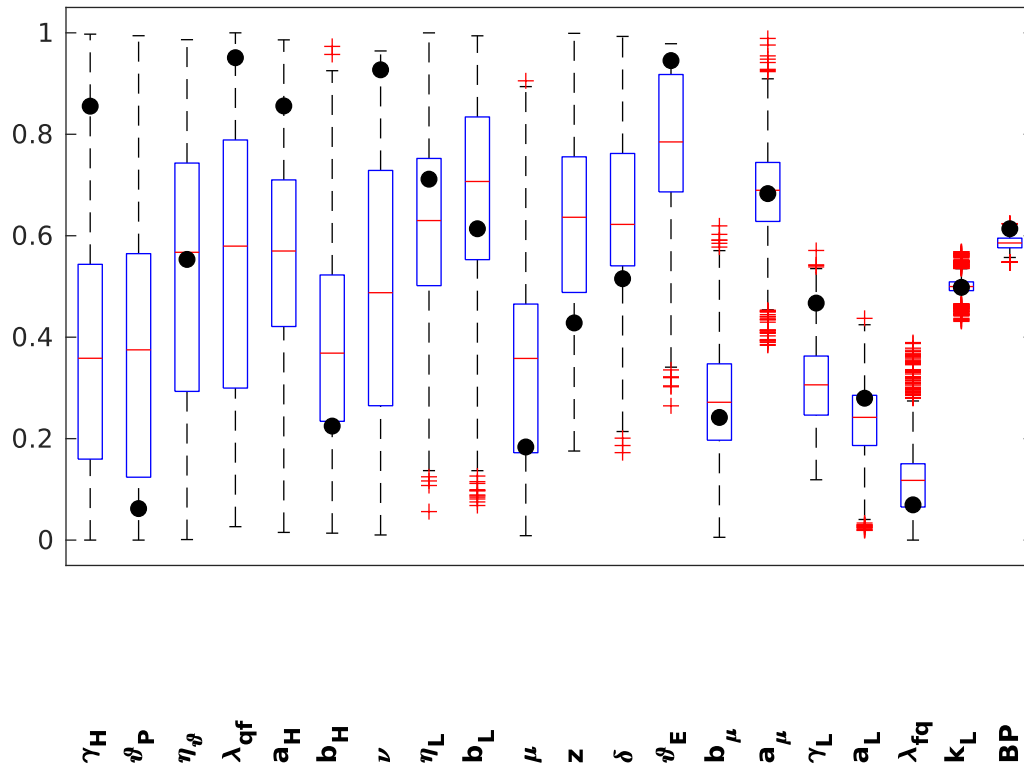
3.2. Estimated parameters with their intervals

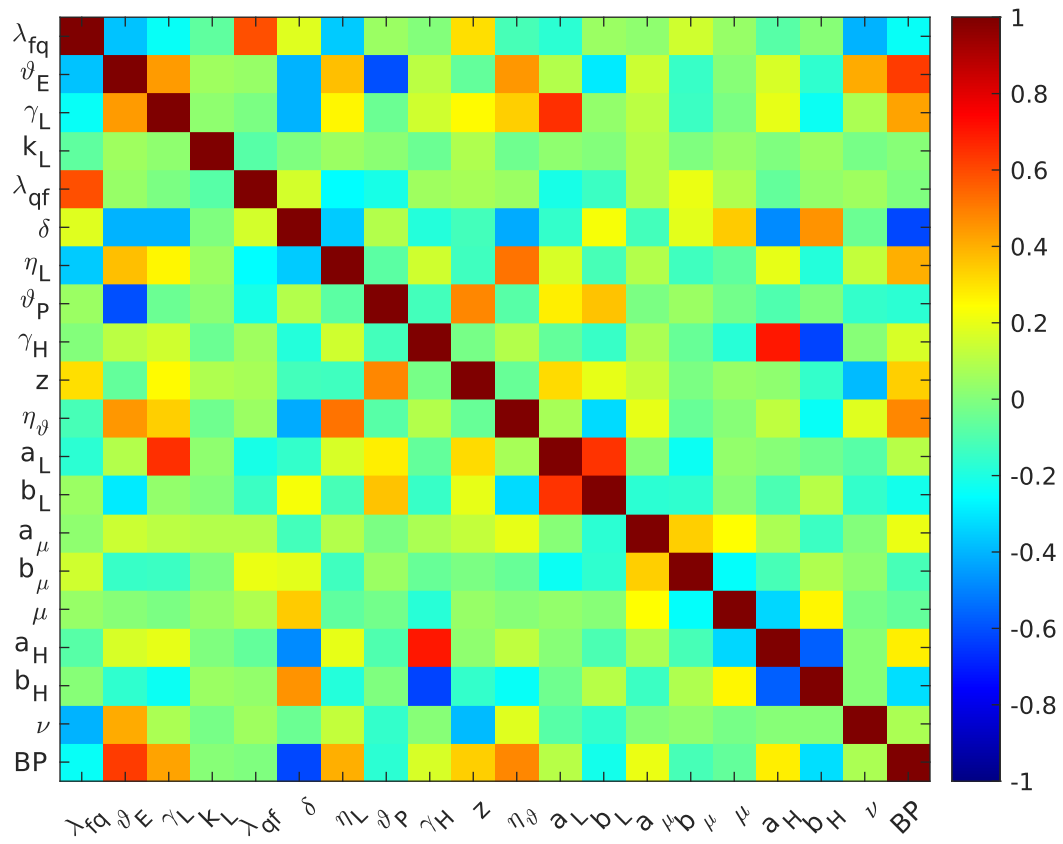
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

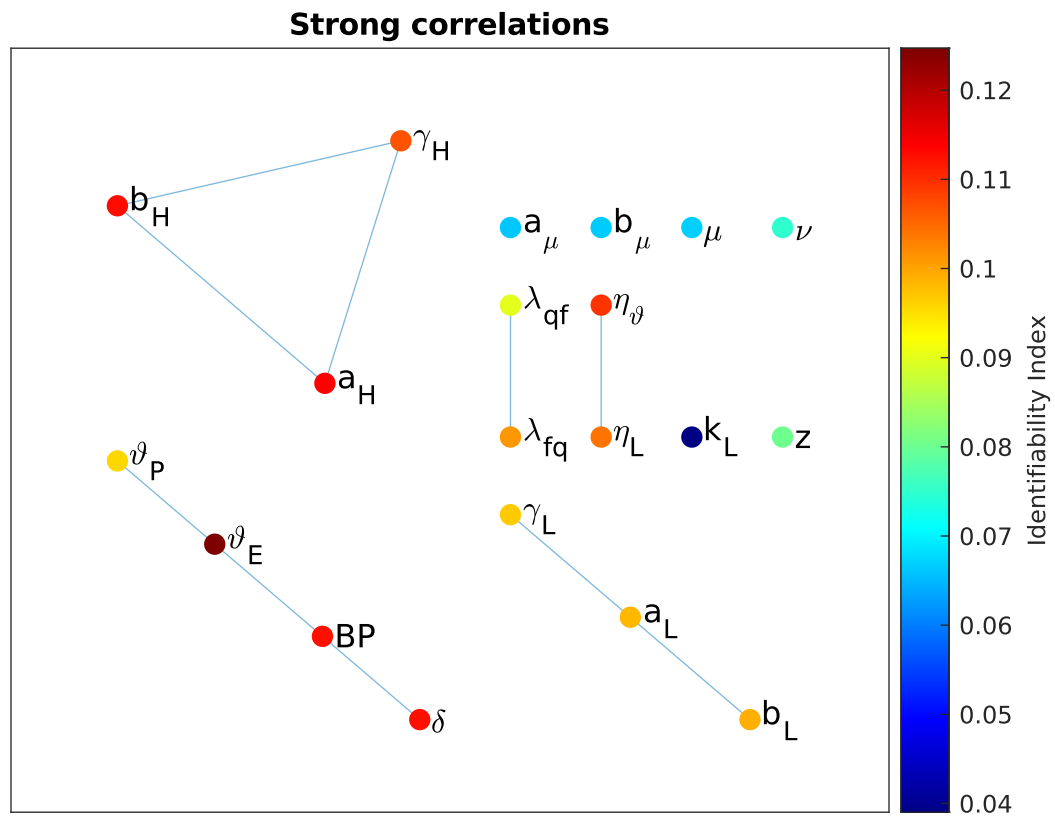
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|------------|----------|
| λ_{fq} | '0.0586' | '0.0979' | '0.1177' | '0.0695' | '0.1009' |
| ϑ_E | '0.9342' | '0.9495' | '0.7849' | '0.9453' | '0.1247' |
| γ_L | '0.2455' | '0.5014' | '0.3061' | '0.4673' | '0.0967' |
| k_L | '2.0467' | '7.0665' | '5.4983' | '5.4843' | '0.039' |
| λ_{qf} | '0.7033' | '0.9824' | '0.5795' | '0.951' | '0.0901' |
| δ | '0.0296' | '0.0781' | '0.0934' | '0.0773' | '0.1126' |
| η_L | '0.5932' | '0.9375' | '0.6299' | '0.7115' | '0.1041' |
| ϑ_P | '0.0586' | '0.0876' | '0.375' | '0.0621' | '0.0956' |
| γ_H | '0.3413' | '0.8712' | '0.3585' | '0.8554' | '0.1069' |
| z | '11.5357' | '13.5126' | '19.092' | '12.8433' | '0.0804' |
| η_{ϑ} | '0.4802' | '0.5906' | '0.5673' | '0.5533' | '0.1094' |
| a_L | '4.7424' | '6.8071' | '4.3875' | '4.9156' | '0.0985' |
| b_L | '8.2973' | '13.9087' | '10.8974' | '9.5928' | '0.0992' |
| a_{μ} | '10.4348' | '13.2486' | '10.6545' | '10.5624' | '0.0662' |
| b_{μ} | '3.9461' | '5.3351' | '4.804' | '4.3854' | '0.0666' |
| μ | '0.1628' | '0.3573' | '0.3581' | '0.1836' | '0.0671' |
| a_H | '10.3131' | '14.2311' | '8.9784' | '12.9823' | '0.1137' |
| b_H | '2.6383' | '4.2366' | '6.1598' | '4.1468' | '0.1128' |
| ν | '160.9686' | '482.0828' | '243.8542' | '463.5477' | '0.0749' |
| BP | '198.0032' | '203.3876' | '195.5' | '198.443' | '0.1124' |

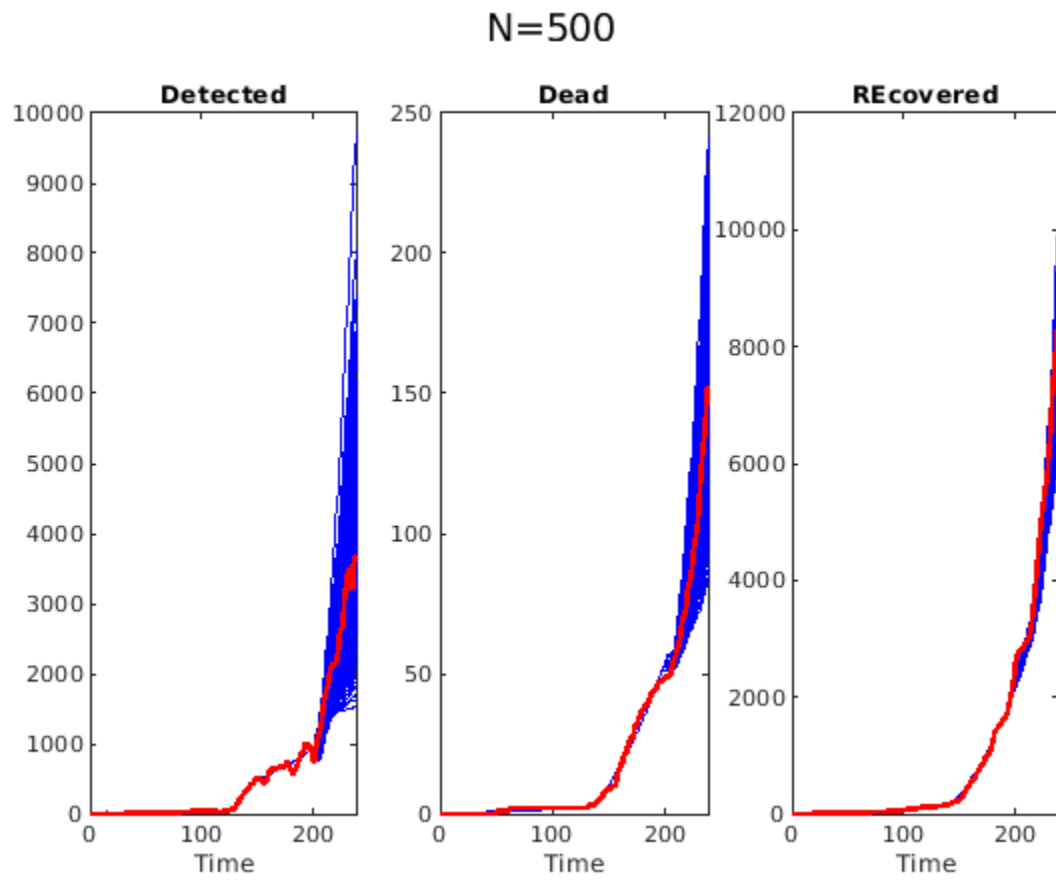
3.3. Identifiability analysis







3.4. Uncertainty analysys



Chapter 4. Extension number4

4.1. Basic information

The extension to be validated consists of the time series from the data239 to the 269. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

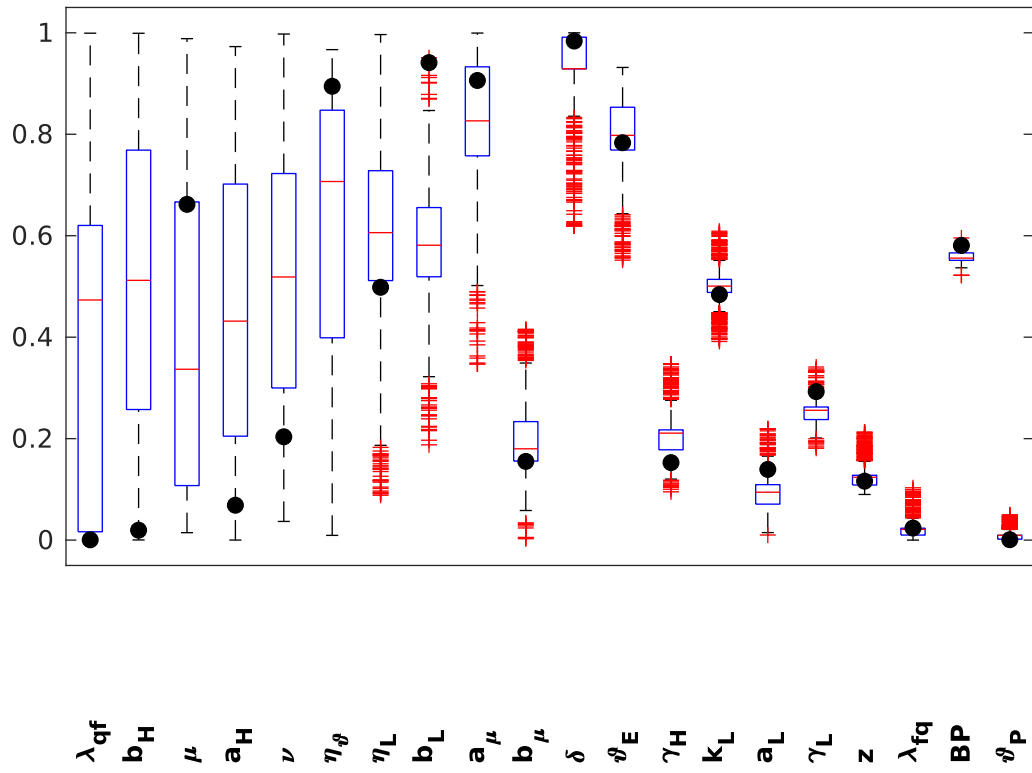
4.2. Estimated parameters with their intervals

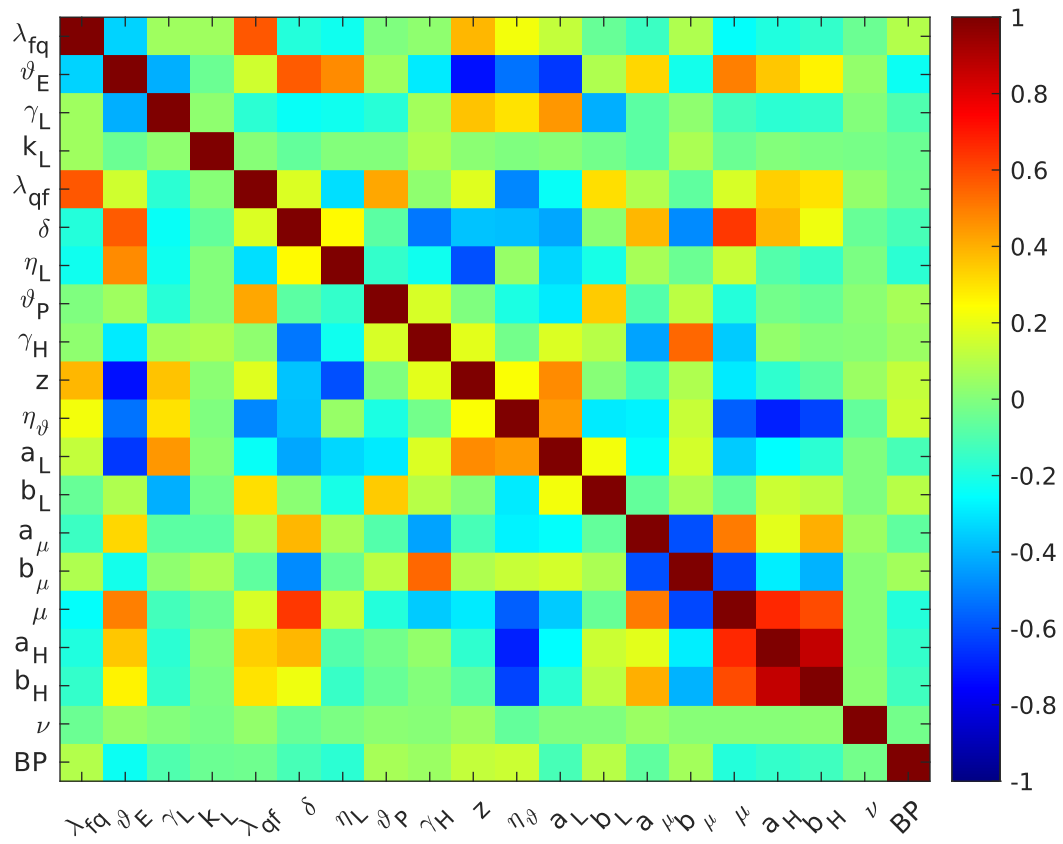
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

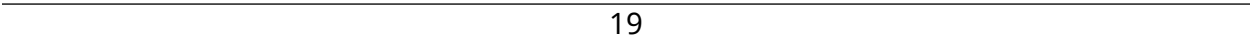
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|------------|----------|
| λ_{fq} | '0.0205' | '0.086' | '0.0211' | '0.0238' | '0.101' |
| ϑ_E | '0.538' | '0.9593' | '0.7978' | '0.7833' | '0.1635' |
| γ_L | '0.2171' | '0.3013' | '0.2559' | '0.2927' | '0.0804' |
| k_L | '1' | '10' | '5.506' | '5.3564' | '0.0415' |
| λ_{qf} | '0' | '0.0013' | '0.4733' | '0.0006' | '0.1202' |
| δ | '0' | '0.15' | '0.1393' | '0.1476' | '0.1601' |
| η_L | '0.0923' | '1' | '0.606' | '0.4983' | '0.105' |
| ϑ_P | '0' | '0.0017' | '0.0095' | '0.0008' | '0.0623' |
| γ_H | '0.1468' | '0.9062' | '0.2109' | '0.1527' | '0.1033' |
| z | '1.7696' | '5.2686' | '3.7169' | '3.4852' | '0.1194' |
| η_{ϑ} | '0' | '0.96' | '0.7068' | '0.8945' | '0.1709' |
| a_L | '1.2428' | '4.0489' | '2.322' | '2.9514' | '0.1083' |
| b_L | '9.7058' | '15' | '9.1373' | '14.1769' | '0.076' |
| a_{μ} | '9.3096' | '15' | '12.57' | '13.6844' | '0.1259' |
| b_{μ} | '1' | '4.6858' | '3.5209' | '3.1722' | '0.1325' |
| μ | '0' | '1' | '0.3368' | '0.6618' | '0.2082' |
| a_H | '1.2414' | '3.6332' | '7.043' | '1.9622' | '0.1539' |
| b_H | '1' | '6.0522' | '8.1683' | '1.2729' | '0.1512' |
| ν | '4.9103' | '196.4129' | '259.3289' | '101.8161' | '0.0557' |
| BP | '240.4551' | '245.1553' | '238.7915' | '240.5' | '0.0515' |

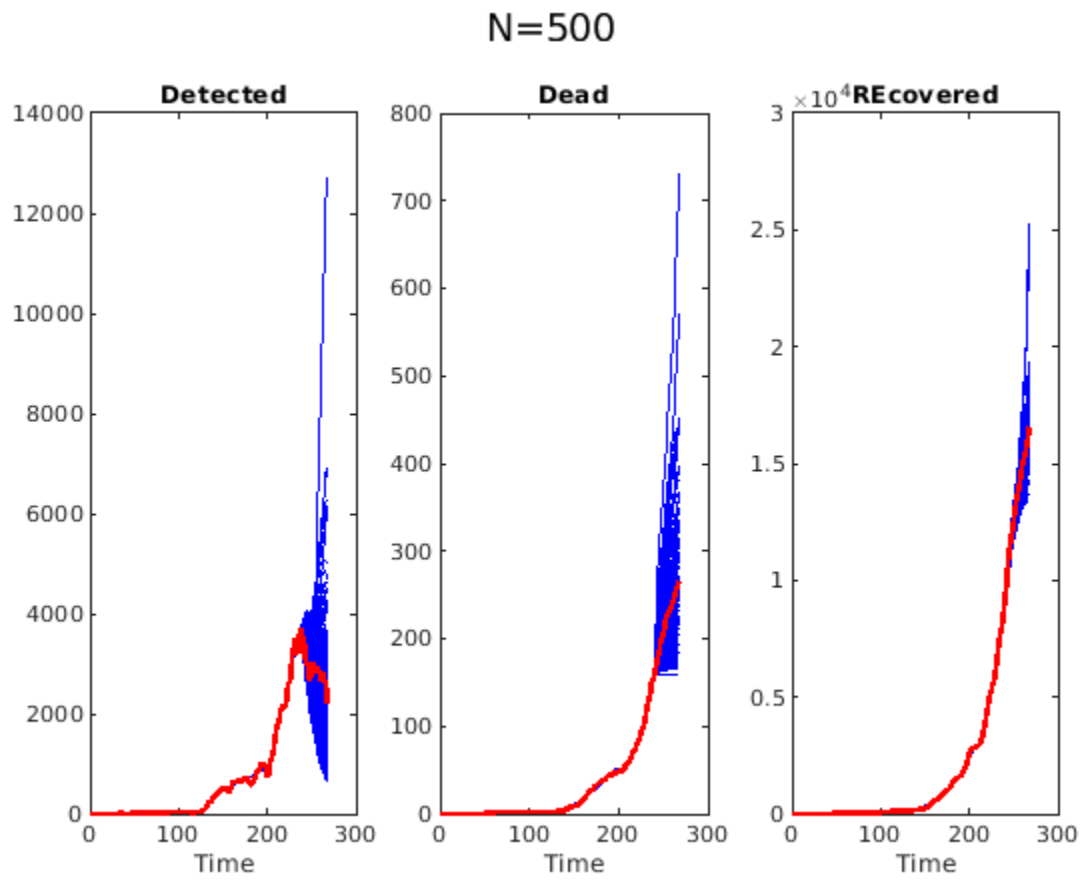
4.3. Identifiability analysys







4.4. Uncertainty analysys



Chapter 5. Extension number5

5.1. Basic information

The extension to be validated consists of the time series from the data269 to the 299. The status of the validation is: COMPLETED.

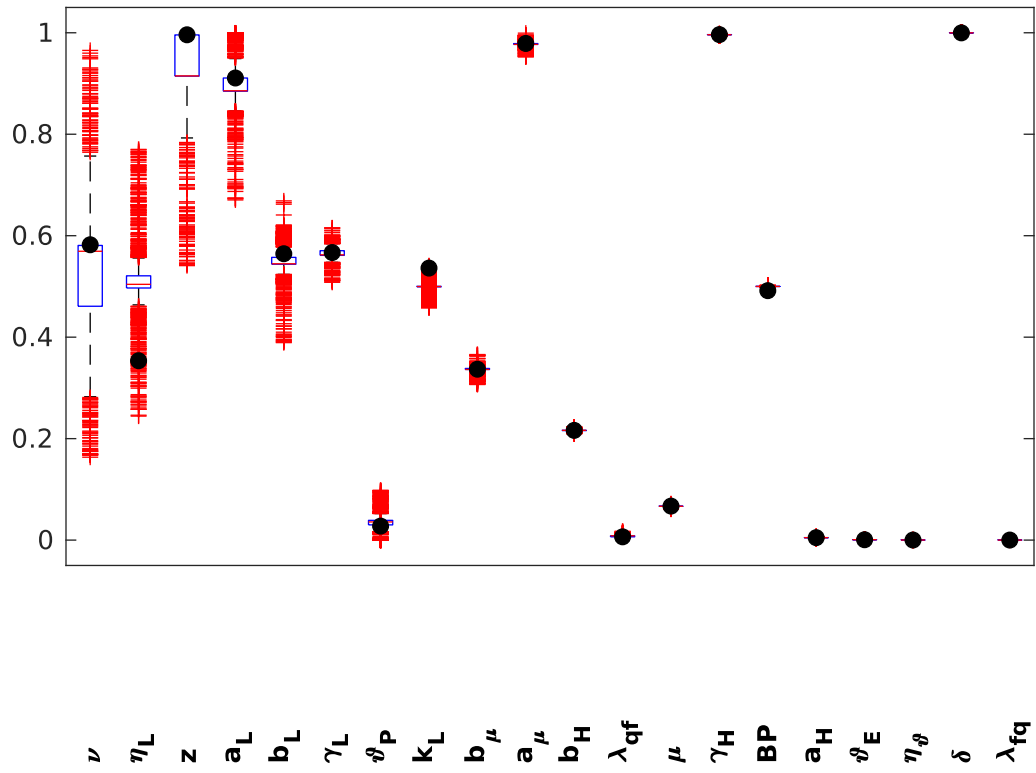
The number of estimations needed to perform the validation was1000.

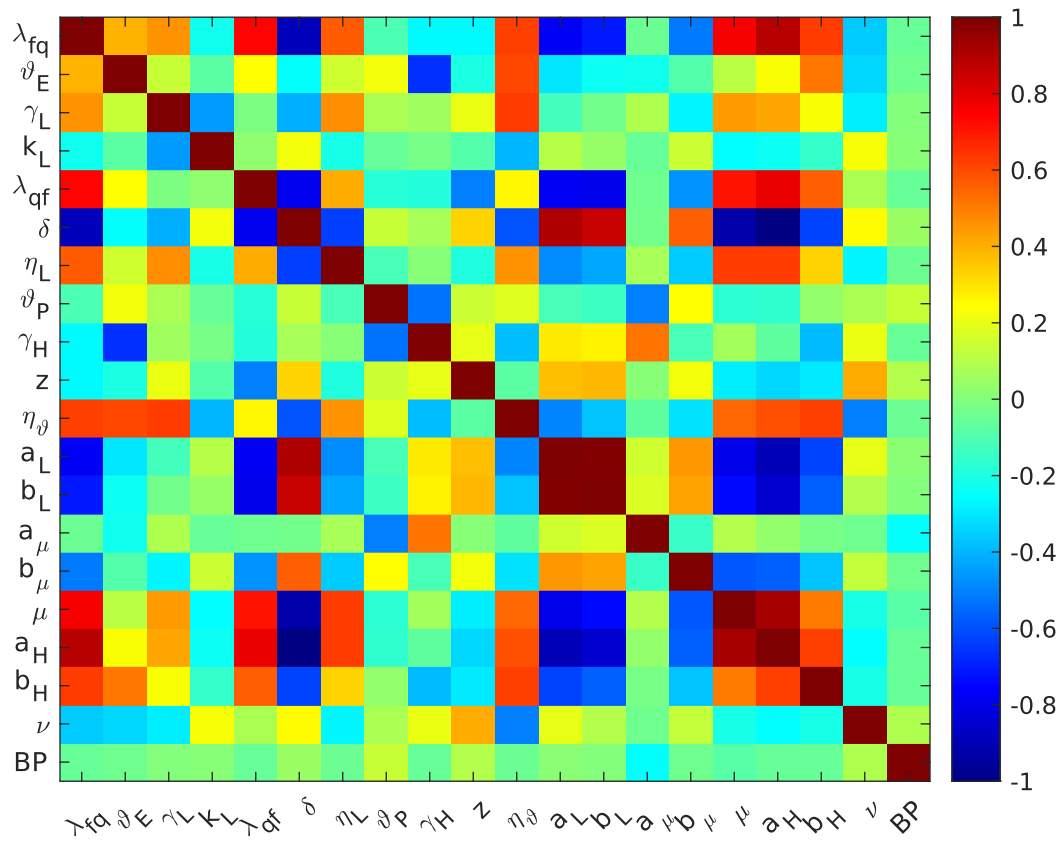
5.2. Estimated parameters with their intervals

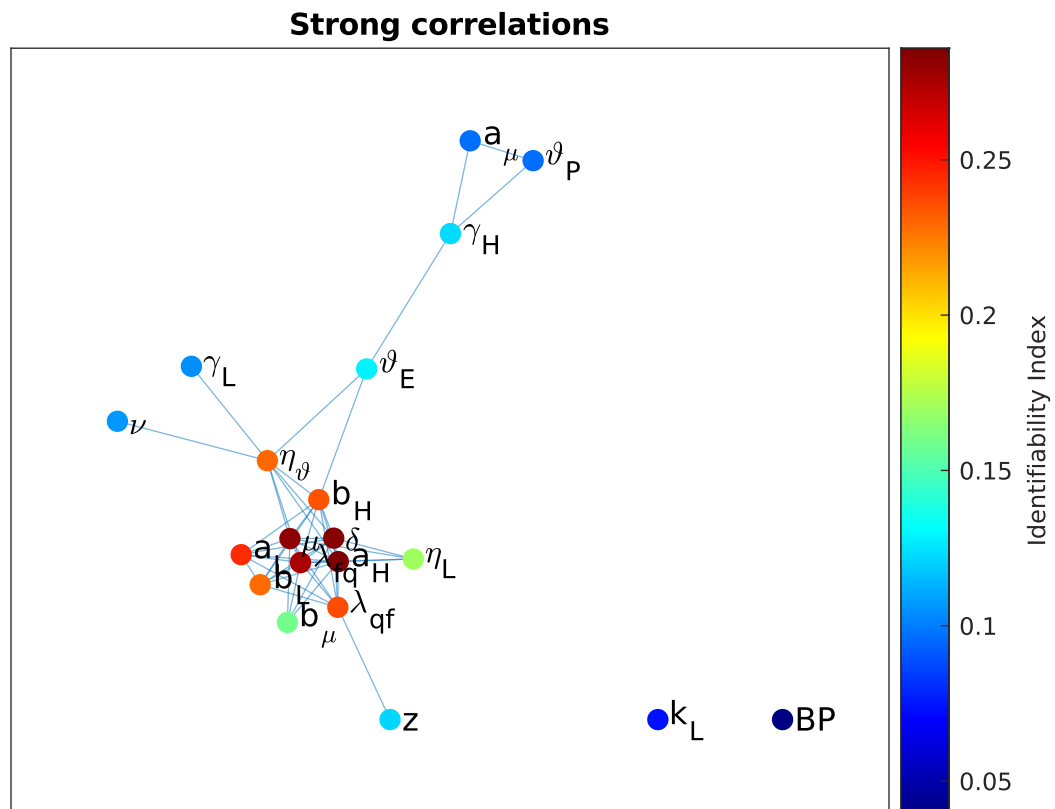
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|------------|----------|
| λ_{fq} | '0' | '0.0192' | '0.0001' | '0.0001' | '0.275' |
| ϑ_E | '0' | '0.0076' | '0.0008' | '0.0007' | '0.1286' |
| γ_L | '0.5546' | '0.5699' | '0.5623' | '0.5668' | '0.1052' |
| k_L | '5.3963' | '5.5997' | '5.498' | '5.8256' | '0.0737' |
| λ_{qf} | '0' | '0.0329' | '0.0084' | '0.0065' | '0.2365' |
| δ | '0.1456' | '0.15' | '0.15' | '0.15' | '0.2833' |
| η_L | '0.4891' | '0.5192' | '0.5041' | '0.3536' | '0.1706' |
| ϑ_P | '0.0304' | '0.0412' | '0.0358' | '0.0276' | '0.0972' |
| γ_H | '0.9878' | '1' | '0.9962' | '0.9963' | '0.1229' |
| z | '26.6214' | '28.249' | '27.4352' | '29.8802' | '0.1223' |
| η_{ϑ} | '0' | '0.0171' | '0.0002' | '0.0002' | '0.2301' |
| a_L | '13.0987' | '13.6987' | '13.3987' | '13.7518' | '0.2443' |
| b_L | '8.4166' | '8.8324' | '8.6245' | '8.9022' | '0.2284' |
| a_{μ} | '14.4671' | '14.8909' | '14.679' | '14.7048' | '0.0968' |
| b_{μ} | '5.566' | '5.8512' | '5.7086' | '5.7158' | '0.16' |
| μ | '0.0454' | '0.0879' | '0.0667' | '0.067' | '0.2814' |
| a_H | '1' | '1.4729' | '1.0679' | '1.0674' | '0.2859' |
| b_H | '3.9604' | '4.0991' | '4.0297' | '4.0277' | '0.2343' |
| ν | '276.4388' | '292.8815' | '284.6602' | '291.0699' | '0.1068' |
| BP | '268.9768' | '269.0232' | '269' | '268.5' | '0.04' |

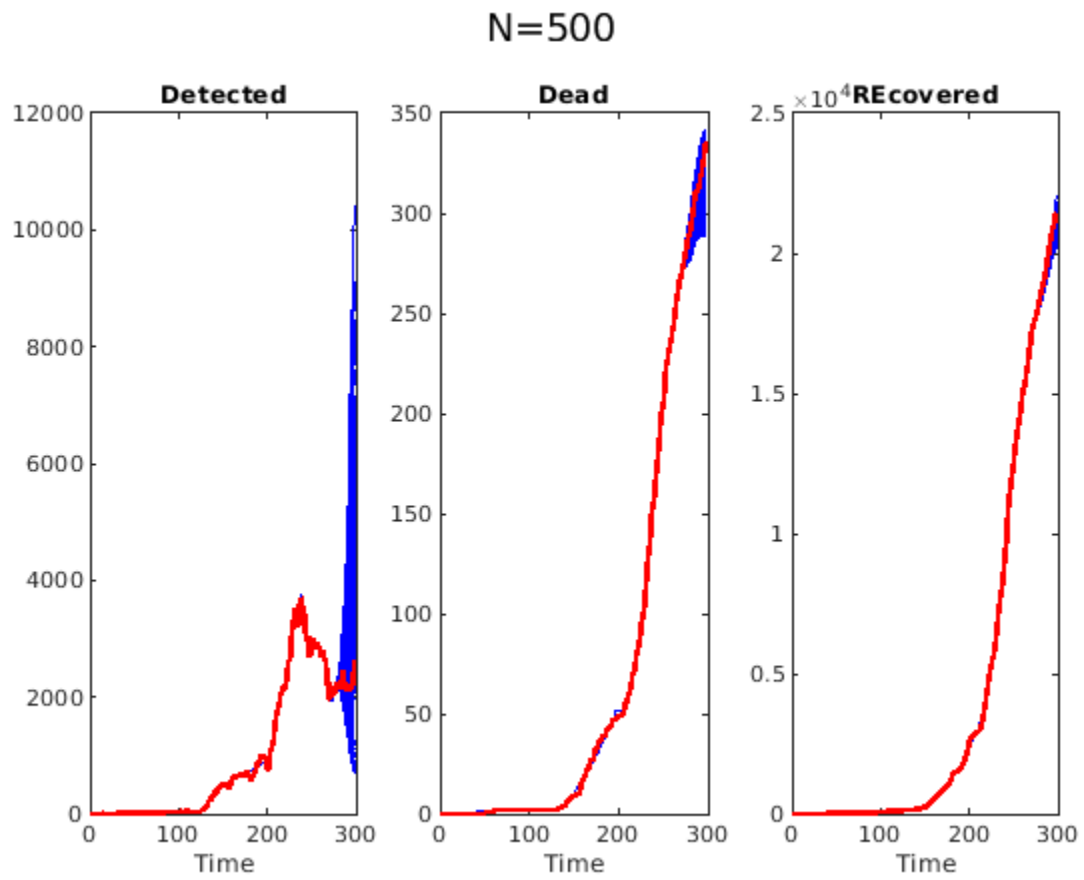
5.3. Identifiability analysis







5.4. Uncertainty analysys



Chapter 6. Extension number6

6.1. Basic information

The extension to be validated consists of the time series from the data299 to the 323. The status of the validation is: COMPLETED.

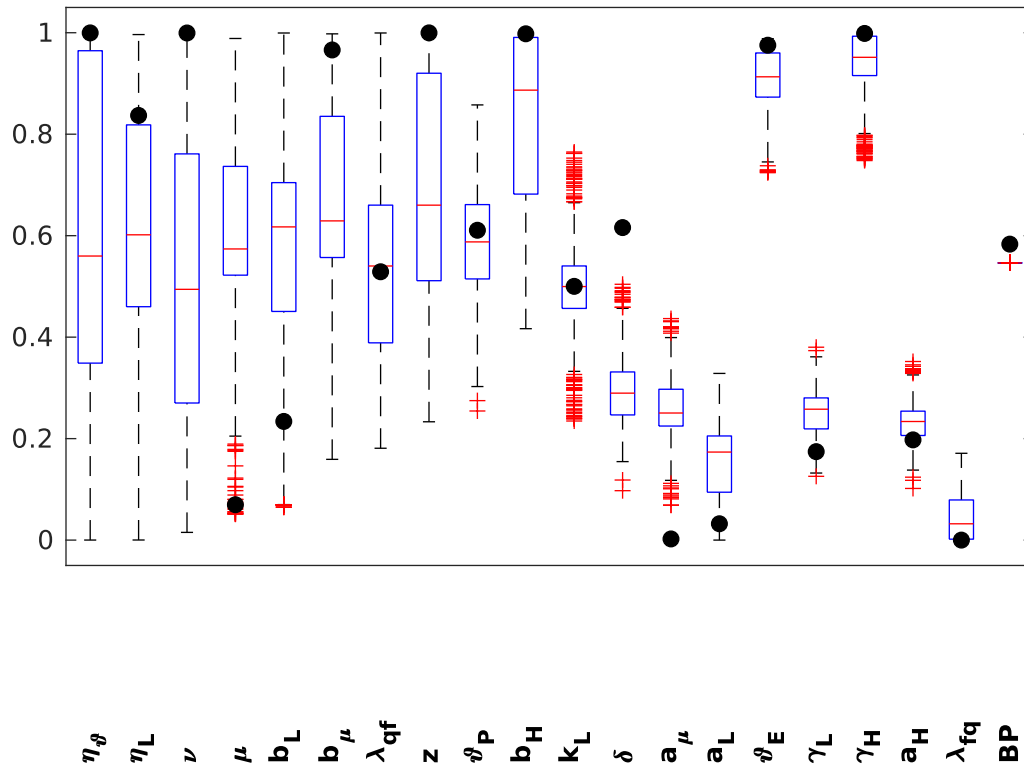
The number of estimations needed to perform the validation was1000.

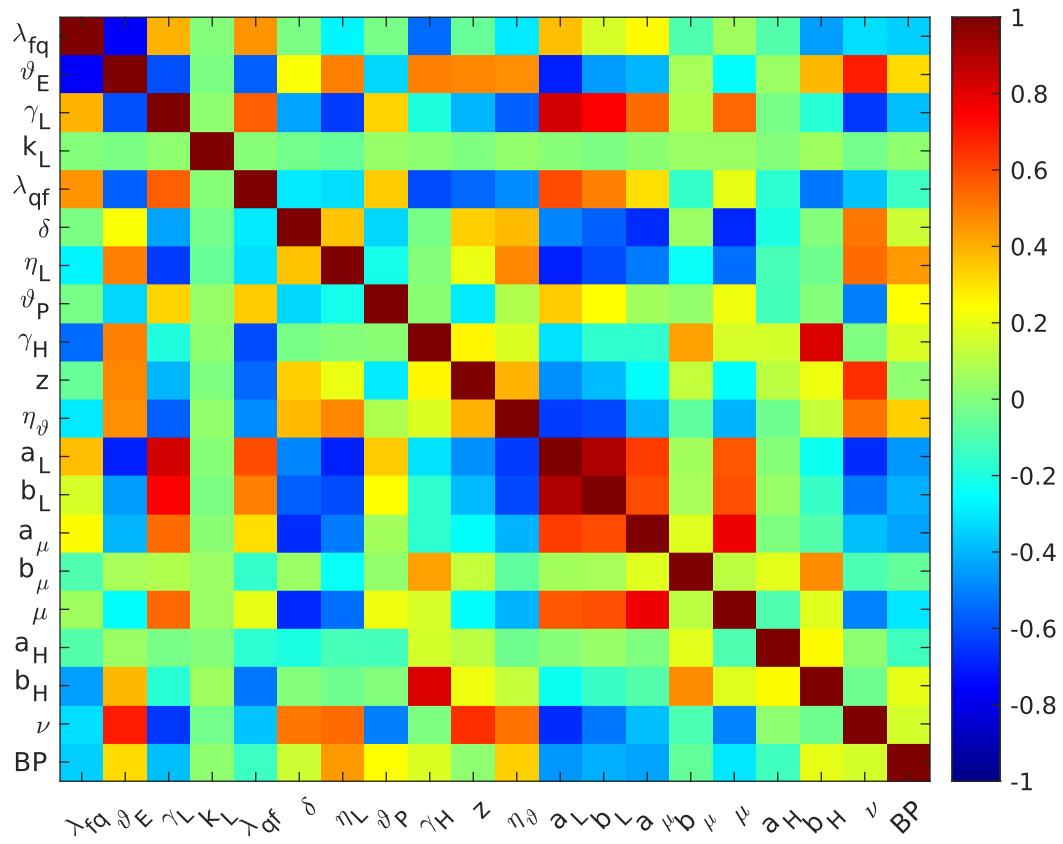
6.2. Estimated parameters with their intervals

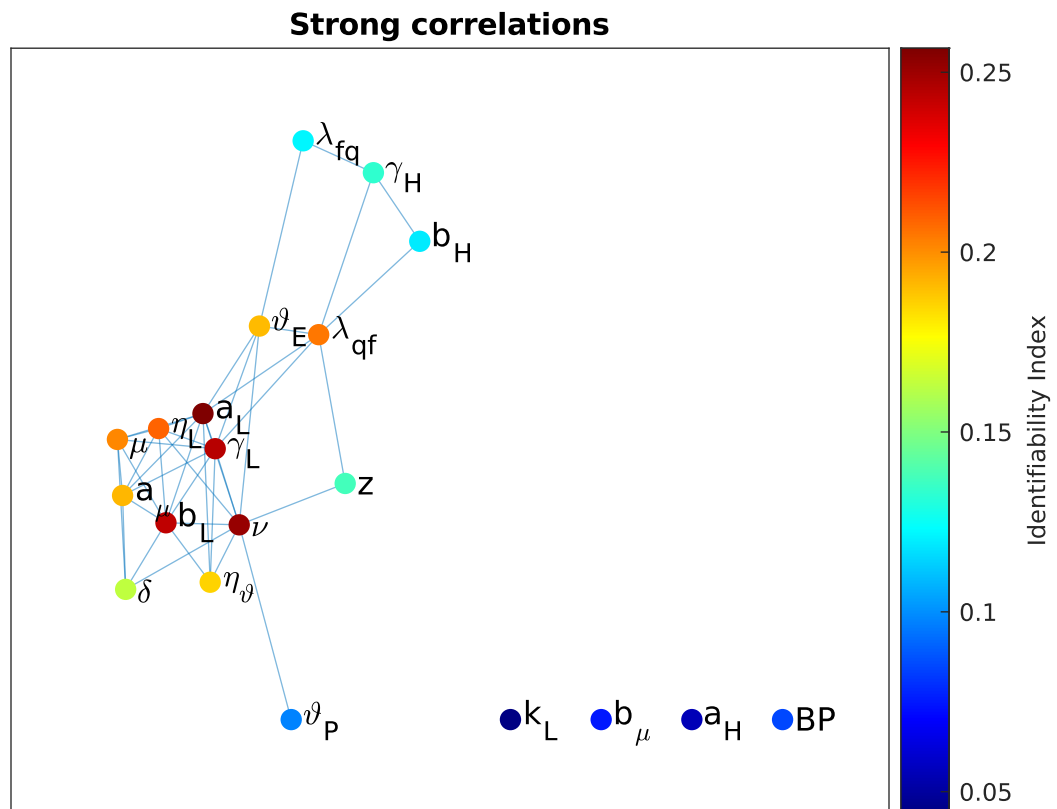
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|-----------|------------|----------|
| λ_{fq} | '0.022' | '0.0423' | '0.0321' | '0' | '0.1219' |
| ϑ_E | '0.9072' | '0.919' | '0.9131' | '0.9754' | '0.1904' |
| γ_L | '0.2525' | '0.2635' | '0.258' | '0.1743' | '0.2443' |
| k_L | '5.378' | '5.617' | '5.4975' | '5.501' | '0.0443' |
| λ_{qf} | '0.525' | '0.5555' | '0.5402' | '0.5289' | '0.2045' |
| δ | '0.041' | '0.0459' | '0.0434' | '0.0924' | '0.1633' |
| η_L | '0.5771' | '0.6263' | '0.6017' | '0.837' | '0.2088' |
| ϑ_P | '0.5747' | '0.6007' | '0.5877' | '0.6107' | '0.0979' |
| γ_H | '0.9391' | '0.9632' | '0.9512' | '0.9986' | '0.1338' |
| z | '19.2213' | '20.3869' | '19.8041' | '29.991' | '0.1378' |
| η_{ϑ} | '0.5303' | '0.5895' | '0.5599' | '0.9997' | '0.186' |
| a_L | '3.3328' | '3.5259' | '3.4294' | '1.4511' | '0.2567' |
| b_L | '9.345' | '9.9343' | '9.6396' | '4.2748' | '0.2426' |
| a_{μ} | '4.3958' | '4.6176' | '4.5067' | '1.0321' | '0.1912' |
| b_{μ} | '9.5598' | '10.034' | '9.7969' | '14.5244' | '0.0755' |
| μ | '0.5531' | '0.5943' | '0.5737' | '0.0697' | '0.2015' |
| a_H | '4.1641' | '4.3808' | '4.2725' | '3.7657' | '0.0556' |
| b_H | '13.2102' | '13.6185' | '13.4144' | '14.9704' | '0.1196' |
| ν | '234.8687' | '259.3673' | '247.118' | '499.7463' | '0.2516' |
| BP | '298.432' | '298.568' | '298.5' | '300.5' | '0.0856' |

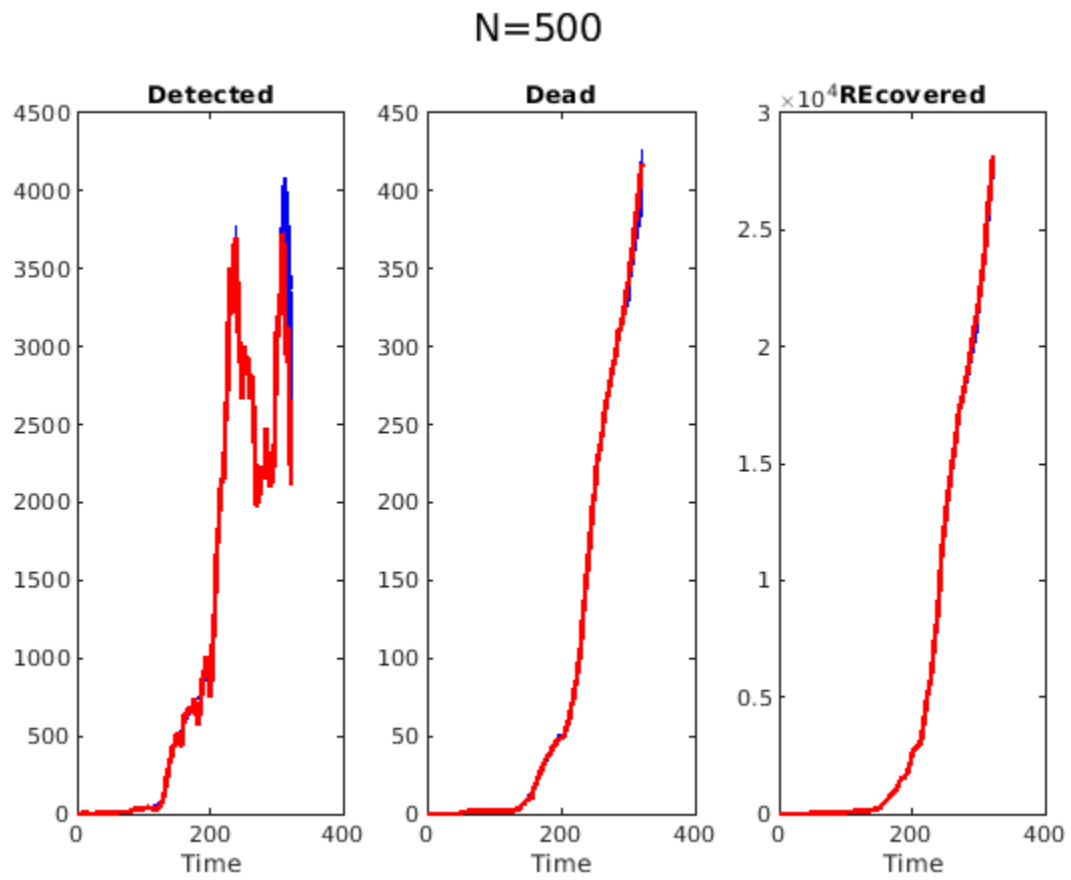
6.3. Identifiability analysys







6.4. Uncertainty analysis



Chapter 7. Extension number7

7.1. Basic information

The extension to be validated consists of the time series from the data323 to the 364. The status of the validation is: COMPLETED.

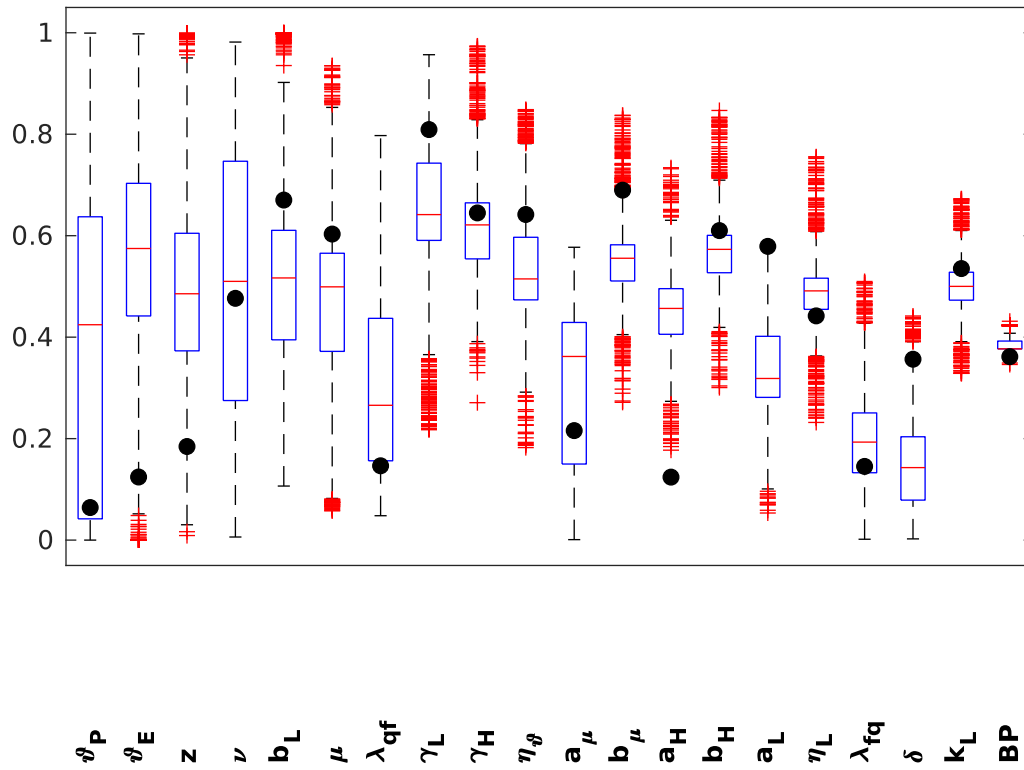
The number of estimations needed to perform the validation was1000.

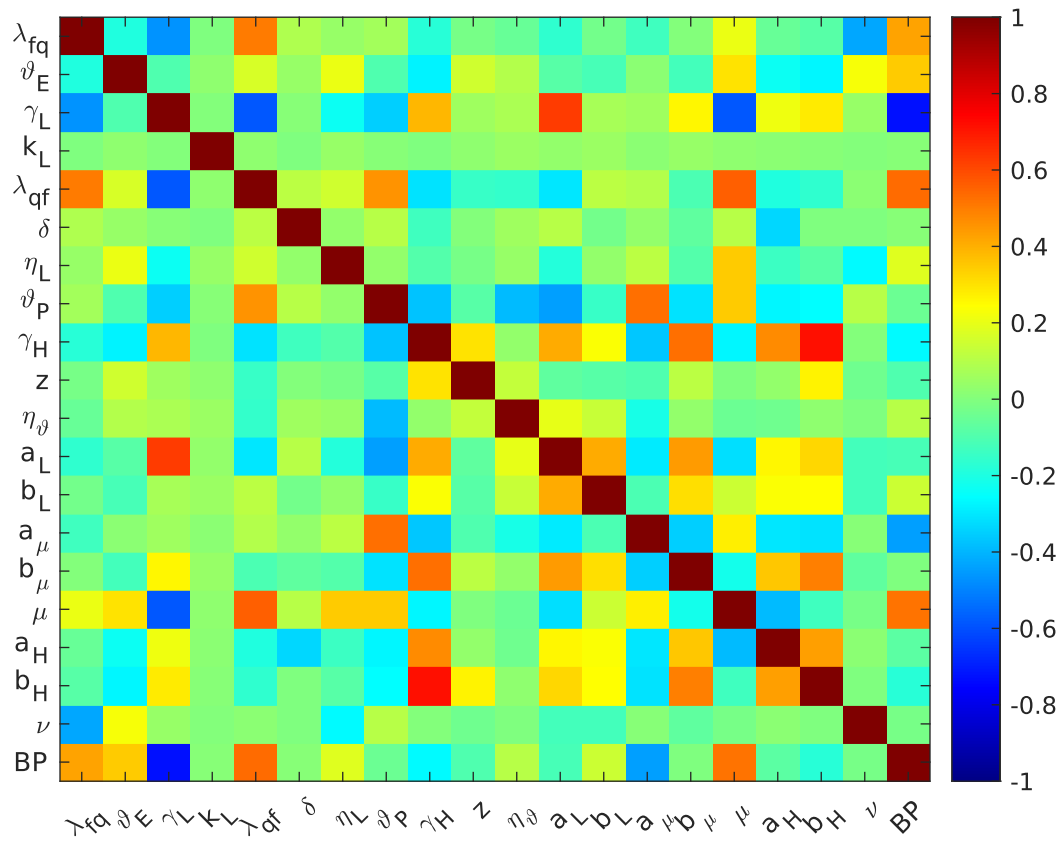
7.2. Estimated parameters with their intervals

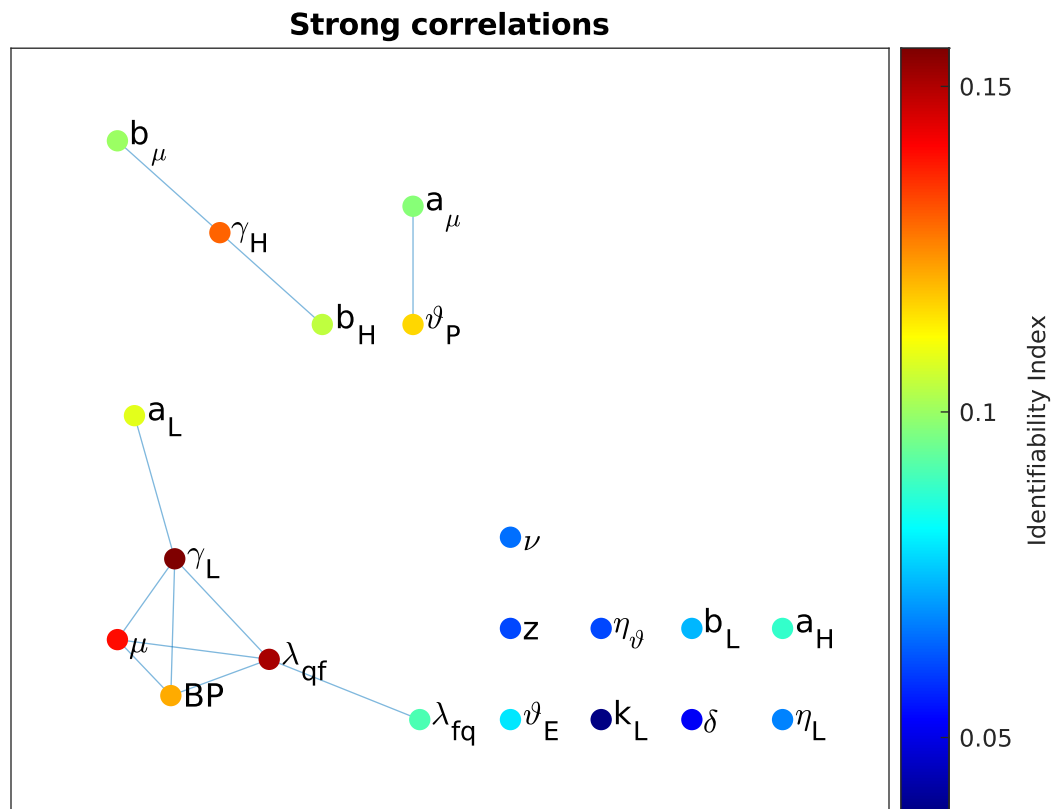
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|------------|----------|
| λ_{fq} | '0.1784' | '0.2079' | '0.1932' | '0.1452' | '0.0911' |
| ϑ_E | '0.5584' | '0.5911' | '0.5748' | '0.1243' | '0.0797' |
| γ_L | '0.6248' | '0.6583' | '0.6416' | '0.8092' | '0.1559' |
| k_L | '5.4274' | '5.5743' | '5.5009' | '5.8166' | '0.0385' |
| λ_{qf} | '0.2484' | '0.283' | '0.2657' | '0.1465' | '0.151' |
| δ | '0.0198' | '0.0231' | '0.0214' | '0.0535' | '0.0522' |
| η_L | '0.4774' | '0.505' | '0.4912' | '0.4419' | '0.068' |
| ϑ_P | '0.4007' | '0.4483' | '0.4245' | '0.0642' | '0.1163' |
| γ_H | '0.6084' | '0.6342' | '0.6213' | '0.6449' | '0.1295' |
| z | '14.1292' | '15.0036' | '14.5664' | '5.5342' | '0.0613' |
| η_{ϑ} | '0.502' | '0.5276' | '0.5148' | '0.6418' | '0.0611' |
| a_L | '5.3224' | '5.5974' | '5.4599' | '9.1053' | '0.1084' |
| b_L | '8.0326' | '8.4354' | '8.234' | '10.3832' | '0.0738' |
| a_{μ} | '5.8801' | '6.2543' | '6.0672' | '4.0214' | '0.0977' |
| b_{μ} | '8.5852' | '8.9699' | '8.7775' | '10.6562' | '0.1' |
| μ | '0.4817' | '0.5166' | '0.4992' | '0.6032' | '0.1398' |
| a_H | '7.2205' | '7.5649' | '7.3927' | '2.738' | '0.0881' |
| b_H | '8.8357' | '9.2099' | '9.0228' | '9.5403' | '0.1045' |
| ν | '244.1054' | '265.8523' | '254.9789' | '238.2679' | '0.0657' |
| BP | '323.1246' | '323.8754' | '323.5' | '322.5' | '0.1212' |

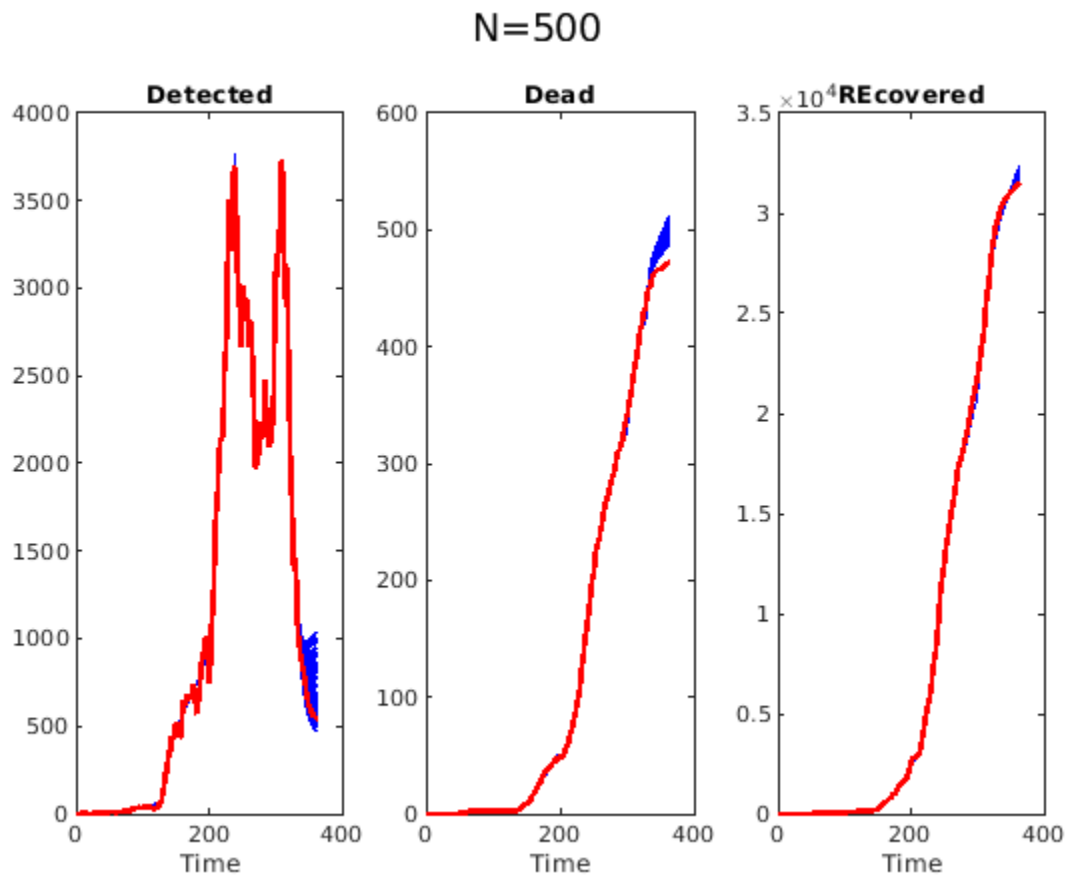
7.3. Identifiability analysis







7.4. Uncertainty analysis



Chapter 8. Extension number8

8.1. Basic information

The extension to be validated consists of the time series from the data364 to the 385. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

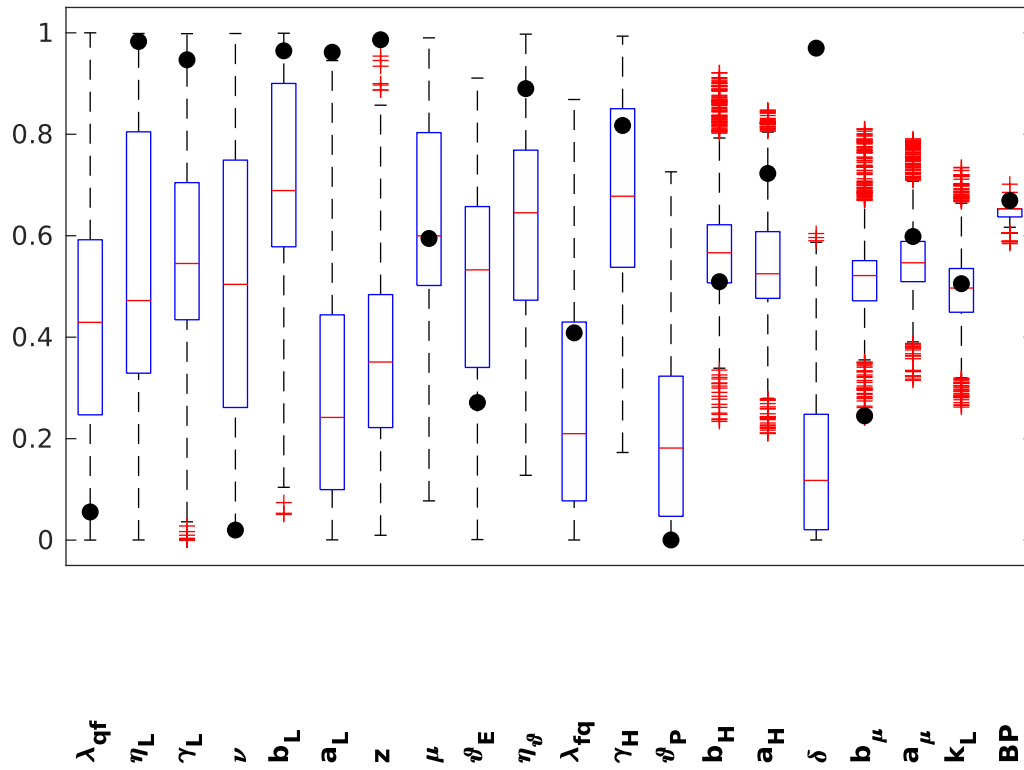
8.2. Estimated parameters with their intervals

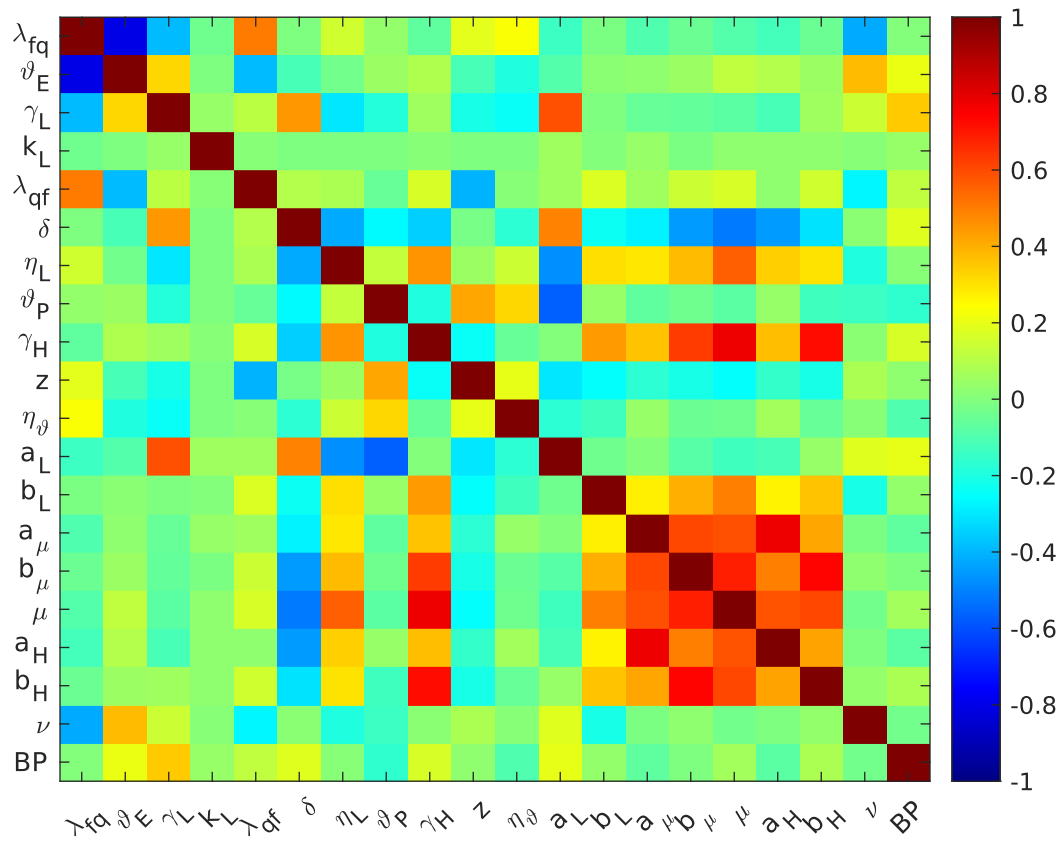
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

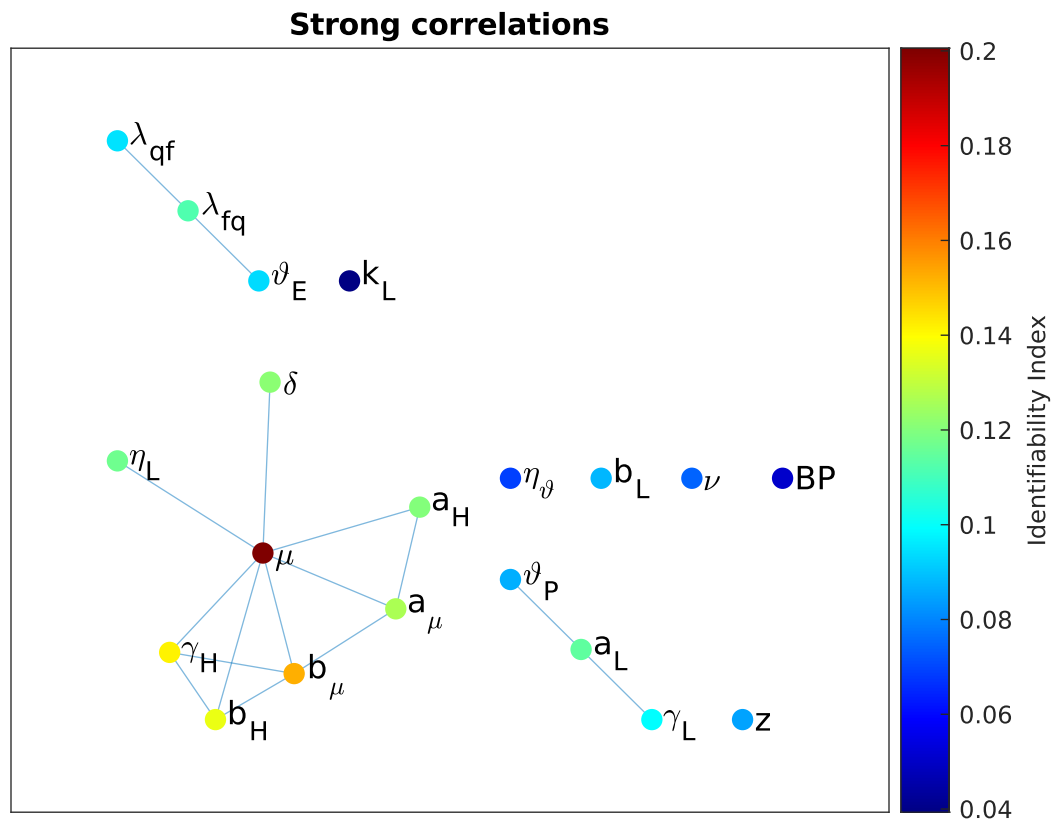
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|-----------|----------|
| λ_{fq} | '0.3261' | '0.4142' | '0.2098' | '0.4086' | '0.1122' |
| ϑ_E | '0.2566' | '0.3857' | '0.5327' | '0.2712' | '0.0938' |
| γ_L | '0.2939' | '1' | '0.5453' | '0.9468' | '0.0996' |
| k_L | '1' | '10' | '5.4725' | '5.5493' | '0.0393' |
| λ_{qf} | '0.032' | '0.0784' | '0.4293' | '0.0555' | '0.0951' |
| δ | '0.015' | '0.15' | '0.0176' | '0.1455' | '0.1213' |
| η_L | '0.5411' | '1' | '0.4722' | '0.9829' | '0.1173' |
| ϑ_P | '0' | '0.0007' | '0.1815' | '0.0003' | '0.087' |
| γ_H | '0' | '1' | '0.6779' | '0.8173' | '0.1415' |
| z | '21.2517' | '30' | '10.5322' | '29.59' | '0.0847' |
| η_{ϑ} | '0.4385' | '0.9478' | '0.6453' | '0.89' | '0.0694' |
| a_L | '11.131' | '15' | '4.3856' | '14.4635' | '0.1145' |
| b_L | '9.126' | '14.7063' | '10.6459' | '14.5031' | '0.0881' |
| a_{μ} | '2.4129' | '15' | '8.6531' | '9.3786' | '0.1266' |
| b_{μ} | '1' | '15' | '8.3006' | '4.4284' | '0.1524' |
| μ | '0' | '1' | '0.5997' | '0.5946' | '0.2006' |
| a_H | '1' | '15' | '8.3502' | '11.1195' | '0.1204' |
| b_H | '1' | '15' | '8.9294' | '8.1315' | '0.1365' |
| ν | '0.0019' | '24.6614' | '252.0952' | '9.8992' | '0.075' |
| BP | '363.4148' | '374.1263' | '363.5' | '364.5' | '0.0508' |

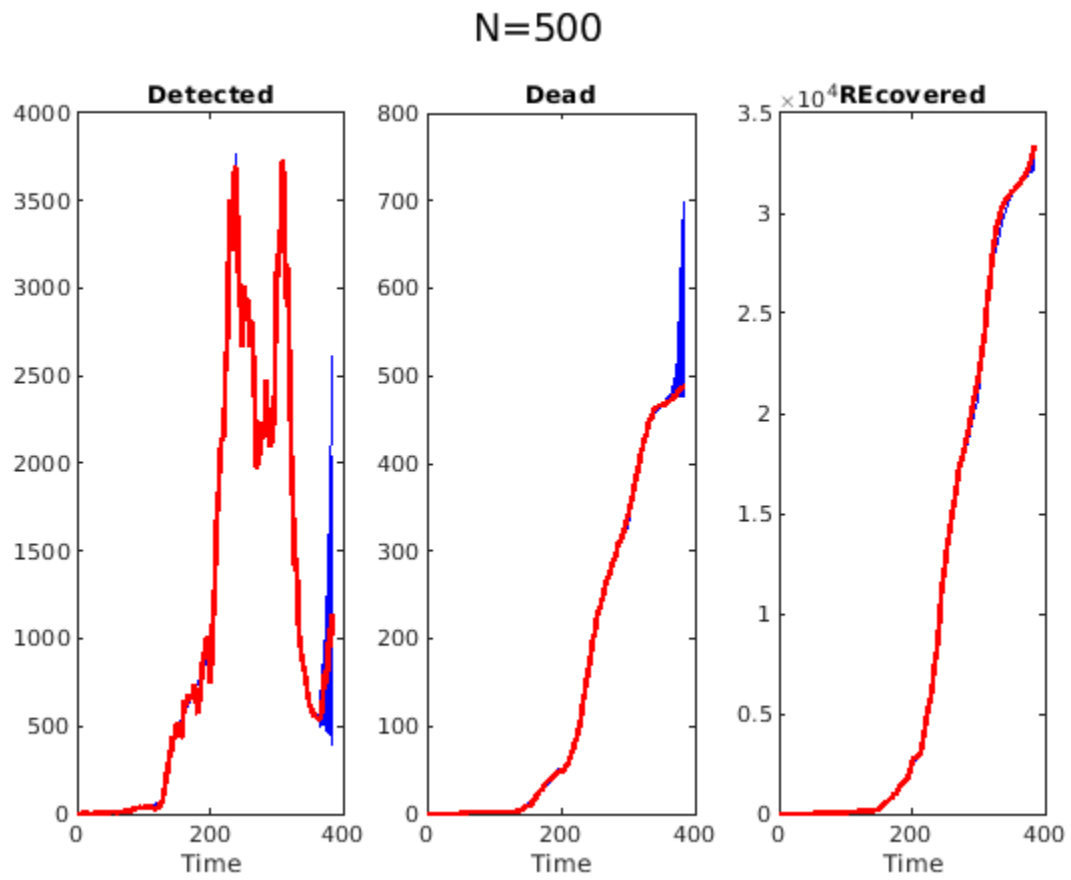
8.3. Identifiability analysys







8.4. Uncertainty analysis



Chapter 9. Extension number9

9.1. Basic information

The extension to be validated consists of the time series from the data385 to the 407. The status of the validation is: COMPLETED.

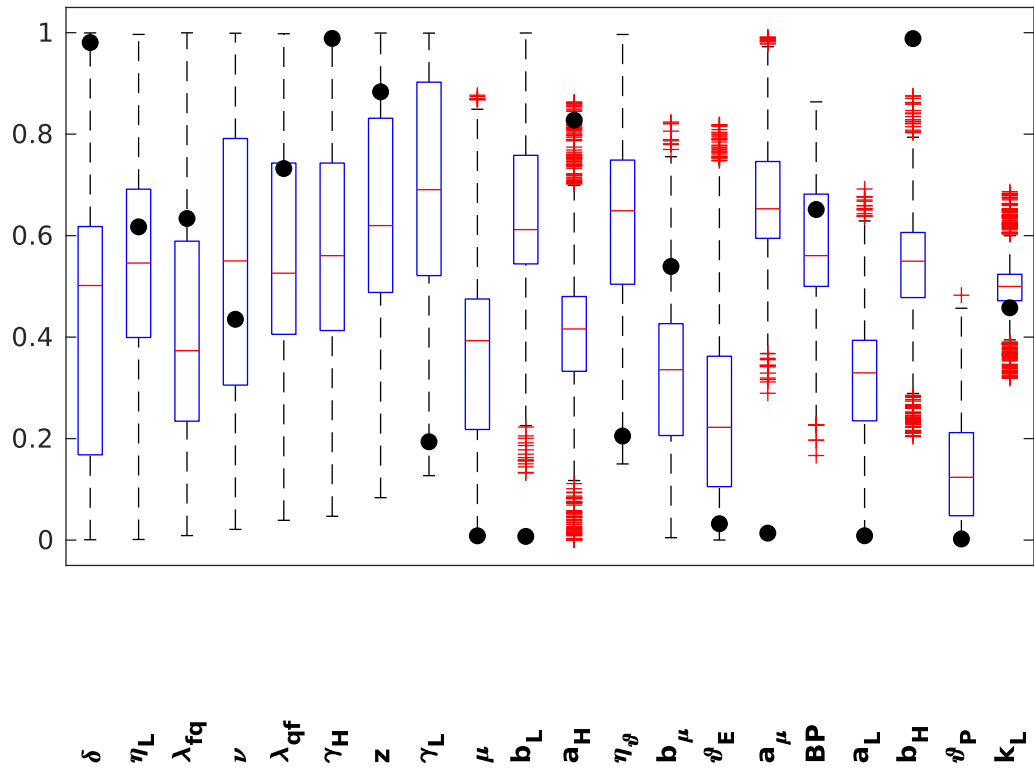
The number of estimations needed to perform the validation was1000.

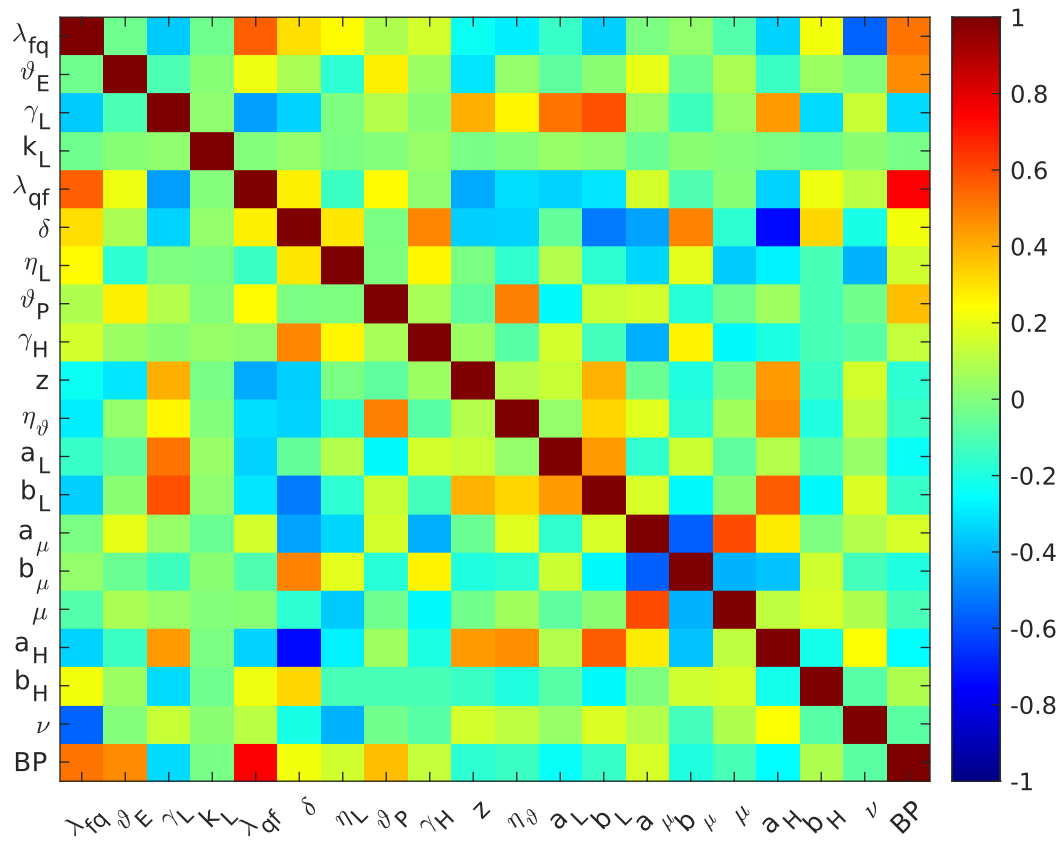
9.2. Estimated parameters with their intervals

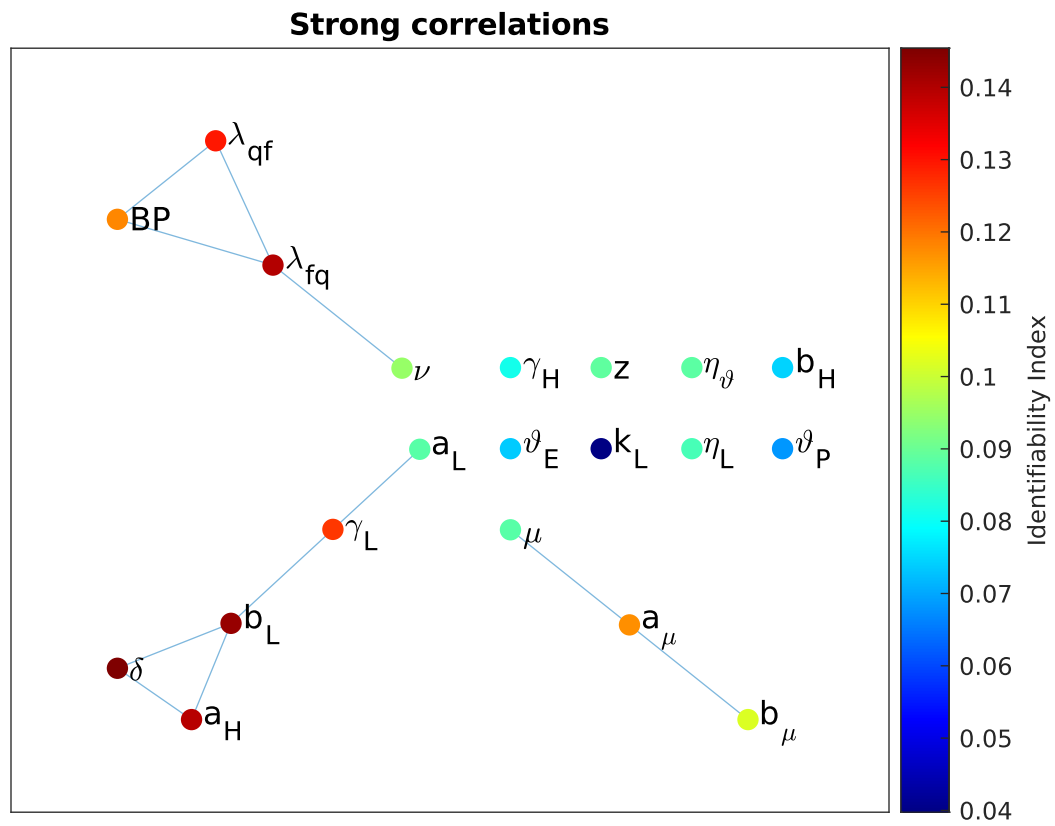
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|------------|----------|
| λ_{fq} | '0.3535' | '0.3932' | '0.3733' | '0.6339' | '0.1397' |
| ϑ_E | '0.2028' | '0.2418' | '0.2223' | '0.0323' | '0.0738' |
| γ_L | '0.6718' | '0.7093' | '0.6906' | '0.1938' | '0.1261' |
| k_L | '5.4132' | '5.5859' | '5.4995' | '5.1204' | '0.0398' |
| λ_{qf} | '0.5088' | '0.5431' | '0.526' | '0.7322' | '0.1295' |
| δ | '0.0716' | '0.0789' | '0.0753' | '0.1471' | '0.1454' |
| η_L | '0.5266' | '0.5653' | '0.546' | '0.6173' | '0.0867' |
| ϑ_P | '0.1145' | '0.133' | '0.1238' | '0.0022' | '0.0683' |
| γ_H | '0.5415' | '0.5796' | '0.5606' | '0.9887' | '0.0814' |
| z | '18.032' | '19.1563' | '18.5942' | '26.5034' | '0.0891' |
| η_{ϑ} | '0.6327' | '0.6655' | '0.6491' | '0.2051' | '0.0885' |
| a_L | '5.4503' | '5.7786' | '5.6144' | '1.1202' | '0.0883' |
| b_L | '9.3131' | '9.8193' | '9.5662' | '1.102' | '0.1427' |
| a_{μ} | '9.9119' | '10.371' | '10.1414' | '1.1922' | '0.1173' |
| b_{μ} | '5.5022' | '5.8999' | '5.7011' | '8.5493' | '0.1019' |
| μ | '0.3764' | '0.4097' | '0.3931' | '0.0085' | '0.0883' |
| a_H | '6.5533' | '7.0973' | '6.8253' | '12.5866' | '0.1394' |
| b_H | '8.5077' | '8.8834' | '8.6955' | '14.8354' | '0.0747' |
| ν | '263.5429' | '286.6038' | '275.0733' | '217.5735' | '0.0948' |
| BP | '382.128' | '382.872' | '382.5' | '385.5' | '0.1181' |

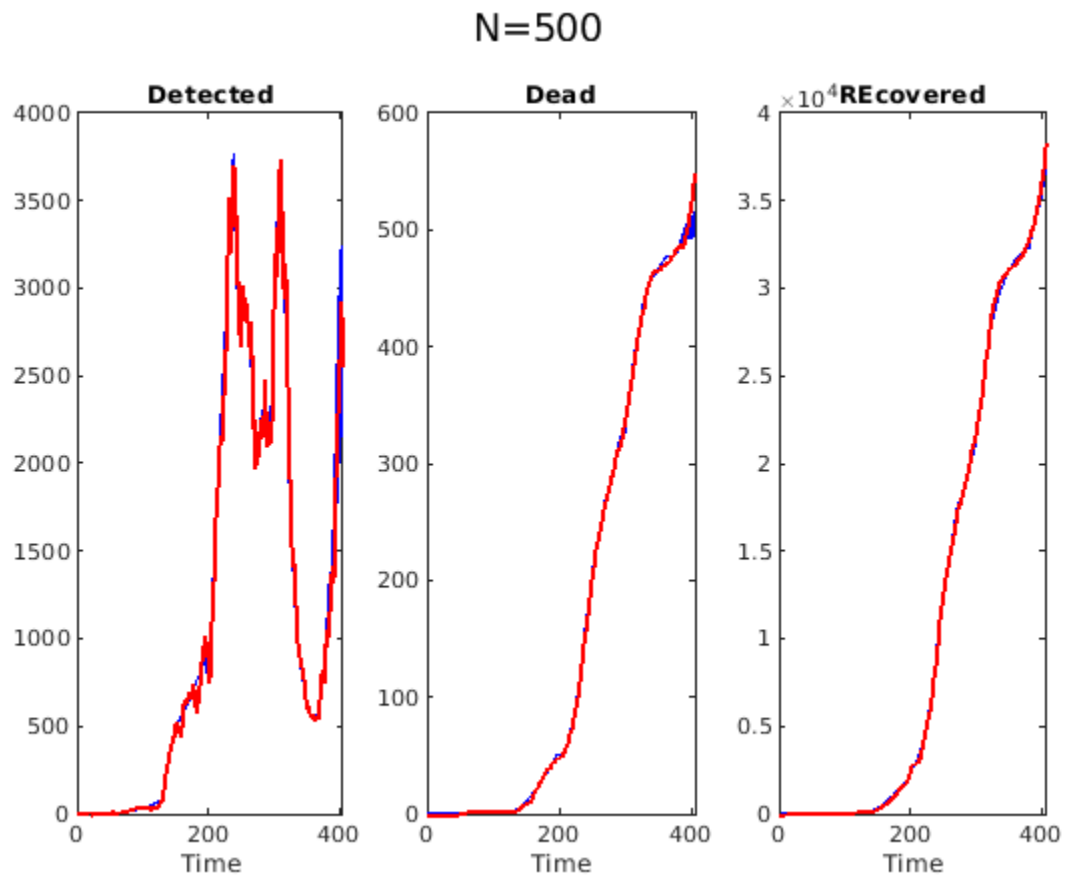
9.3. Identifiability analysis







9.4. Uncertainty analysis



Chapter 10. Extension number10

10.1. Basic information

The extension to be validated consists of the time series from the data407 to the 479. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

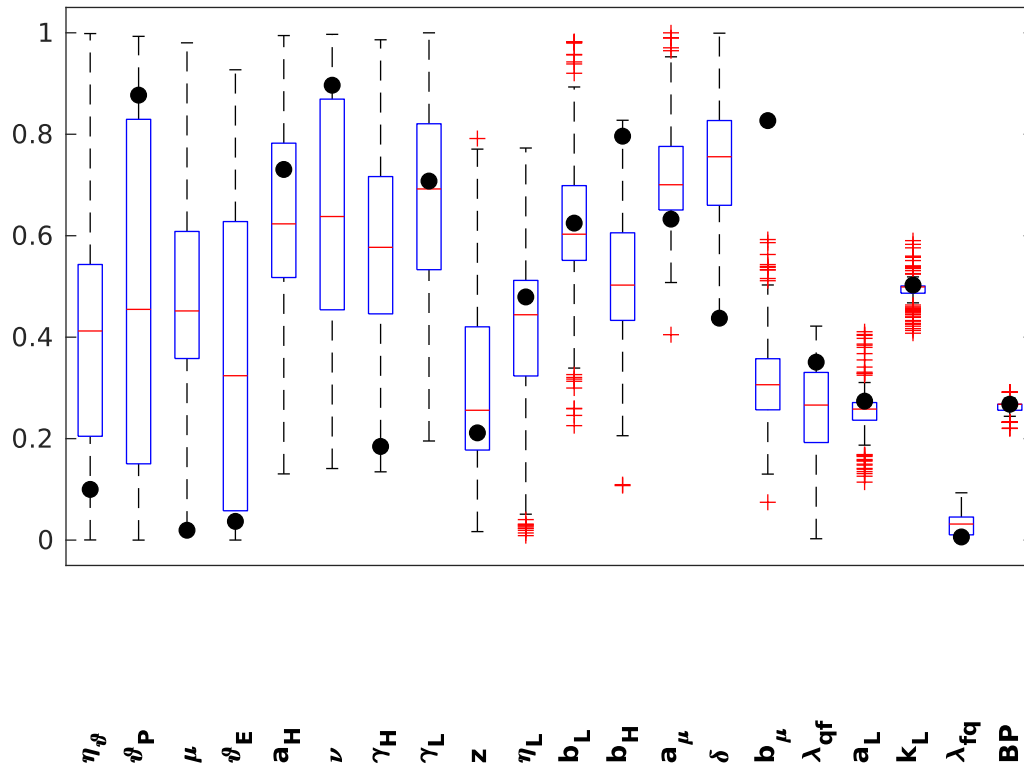
10.2. Estimated parameters with their intervals

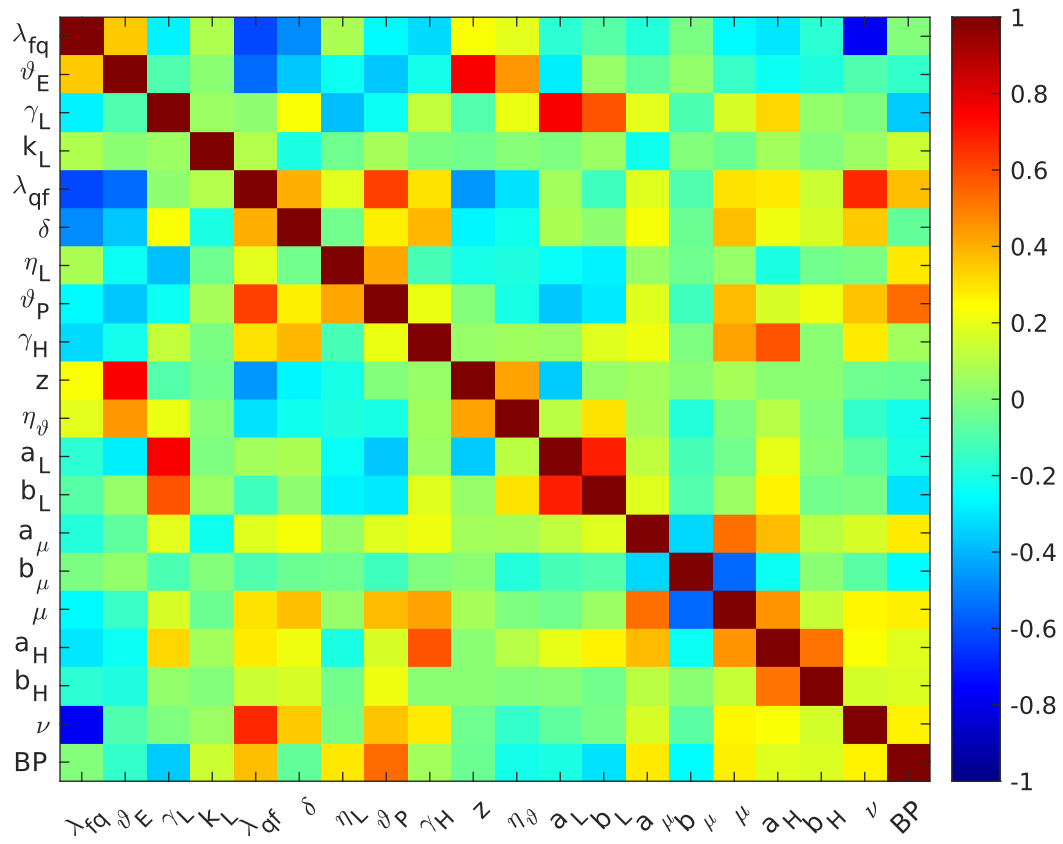
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

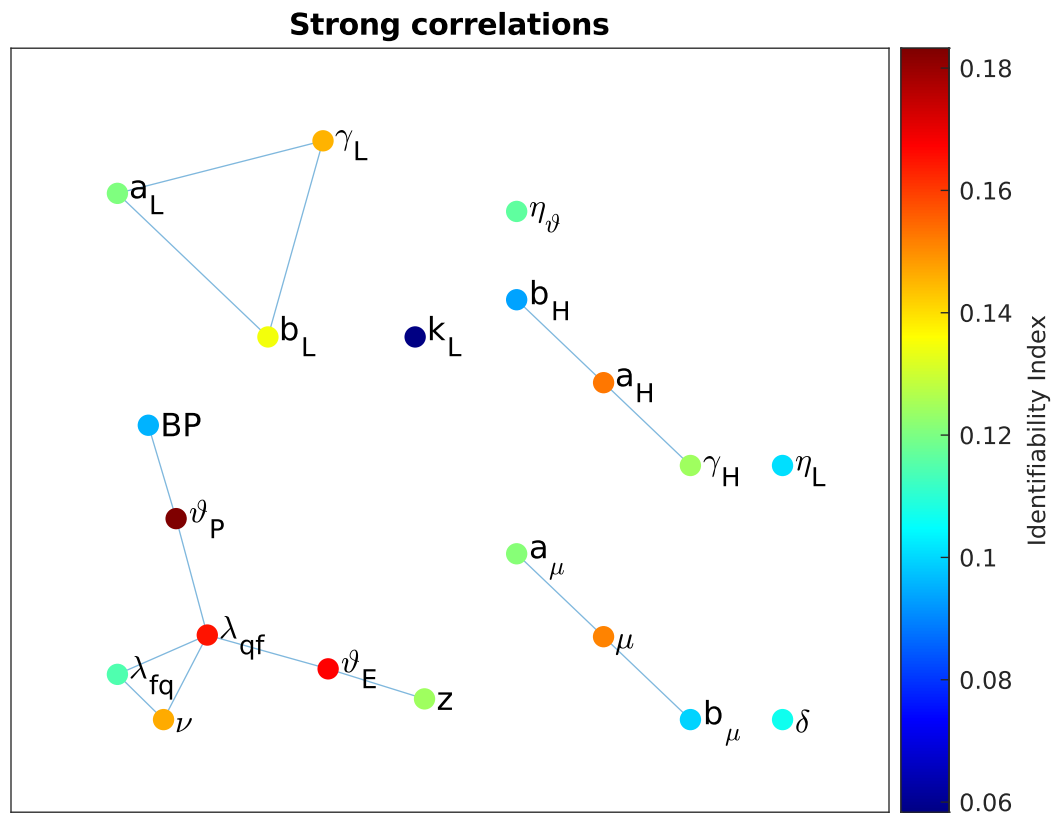
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|------------------|------------|------------|------------|------------|----------|
| \lambda_{fq} | '0.0003' | '0.0133' | '0.0316' | '0.0062' | '0.1146' |
| \vartheta_E | '0.0041' | '0.083' | '0.324' | '0.0369' | '0.1673' |
| \gamma_L | '0.4328' | '0.9702' | '0.6922' | '0.7078' | '0.1452' |
| k_L | '1' | '10' | '5.4915' | '5.5243' | '0.0583' |
| \lambda_{qf} | '0.3436' | '0.8292' | '0.2662' | '0.3508' | '0.1651' |
| \delta | '0.0064' | '0.1312' | '0.1133' | '0.0656' | '0.1067' |
| \eta_L | '0' | '1' | '0.4442' | '0.4793' | '0.101' |
| \vartheta_P | '0.7746' | '0.9012' | '0.4548' | '0.8771' | '0.1833' |
| \gamma_H | '0.0902' | '1' | '0.5771' | '0.1846' | '0.1246' |
| z | '5.4602' | '6.7814' | '7.7731' | '6.3417' | '0.1247' |
| \eta_{\vartheta} | '0.0054' | '0.2053' | '0.4122' | '0.0999' | '0.1168' |
| a_L | '2.8962' | '4.8842' | '4.6158' | '4.8347' | '0.1205' |
| b_L | '7.0979' | '15' | '9.4419' | '9.7476' | '0.1345' |
| a_{\mu} | '1' | '14.3' | '10.8066' | '9.8578' | '0.1215' |
| b_{\mu} | '1' | '15' | '5.2937' | '12.5765' | '0.0996' |
| \mu | '0.003' | '0.0416' | '0.4517' | '0.0194' | '0.1512' |
| a_H | '1.9147' | '15' | '9.7254' | '11.2287' | '0.1528' |
| b_H | '1.252' | '13.6' | '8.0462' | '12.1468' | '0.0937' |
| \nu | '324.5571' | '480.8667' | '318.9208' | '448.3288' | '0.1463' |
| BP | '407.2048' | '441.1669' | '407.5' | '407.5' | '0.0956' |

10.3. Identifiability analysis

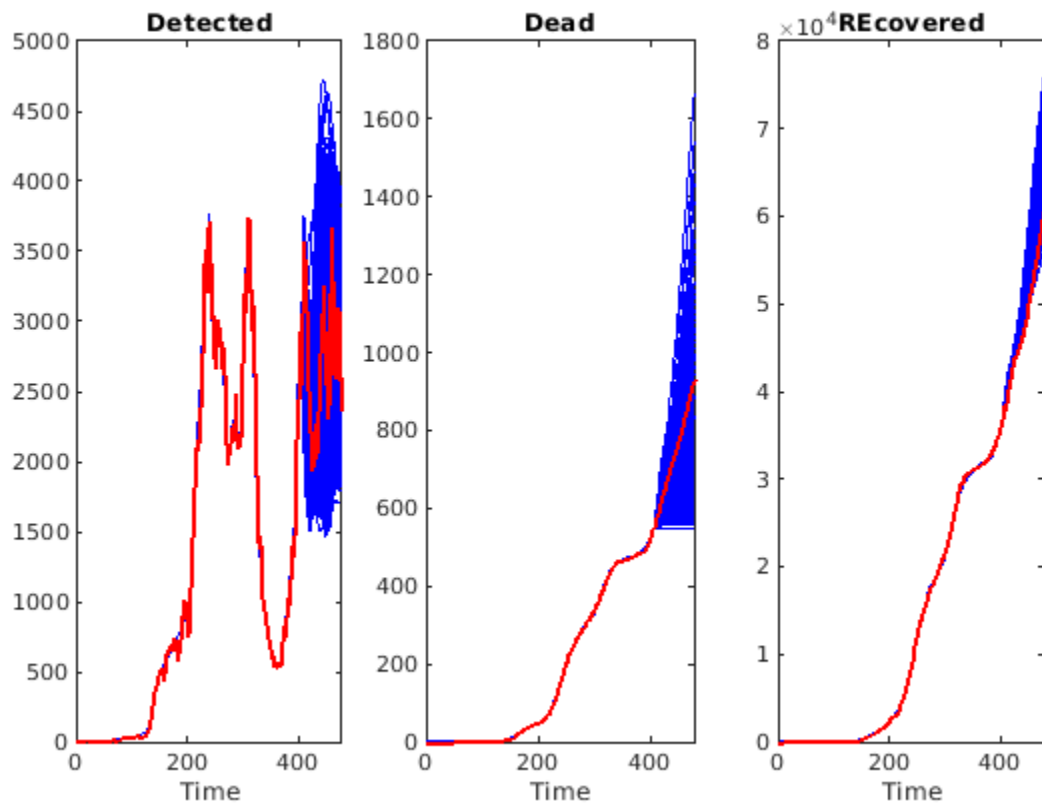






10.4. Uncertainty analysis

N=500



Chapter 11. Extension number11

11.1. Basic information

The extension to be validated consists of the time series from the data479 to the 526. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

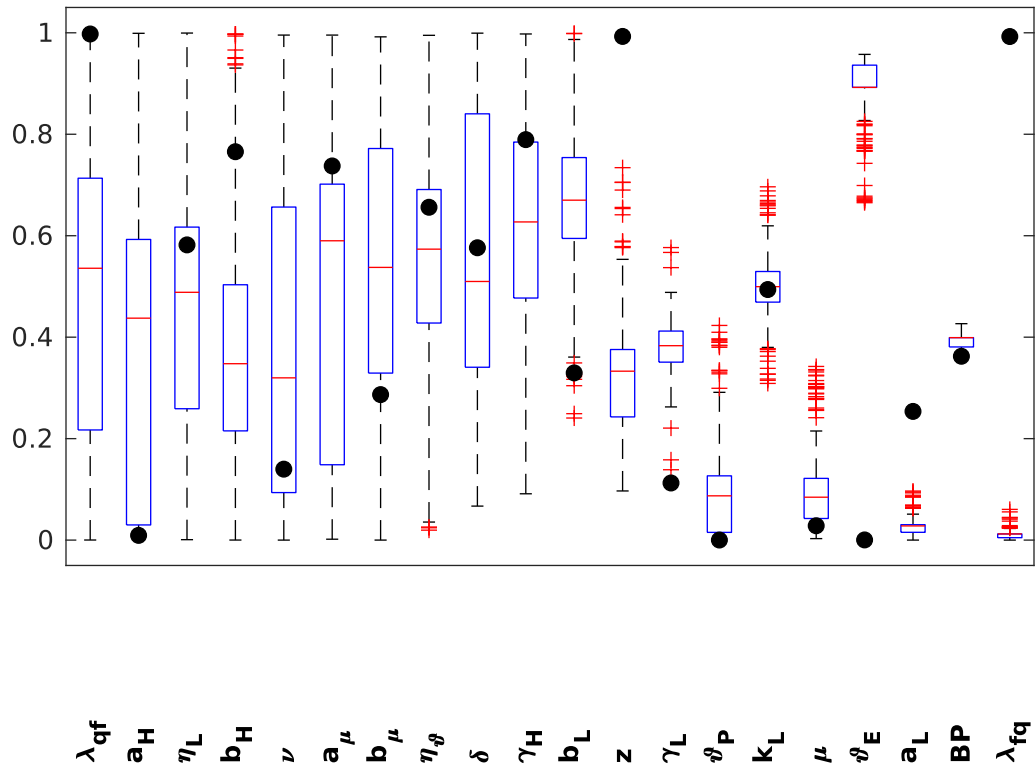
11.2. Estimated parameters with their intervals

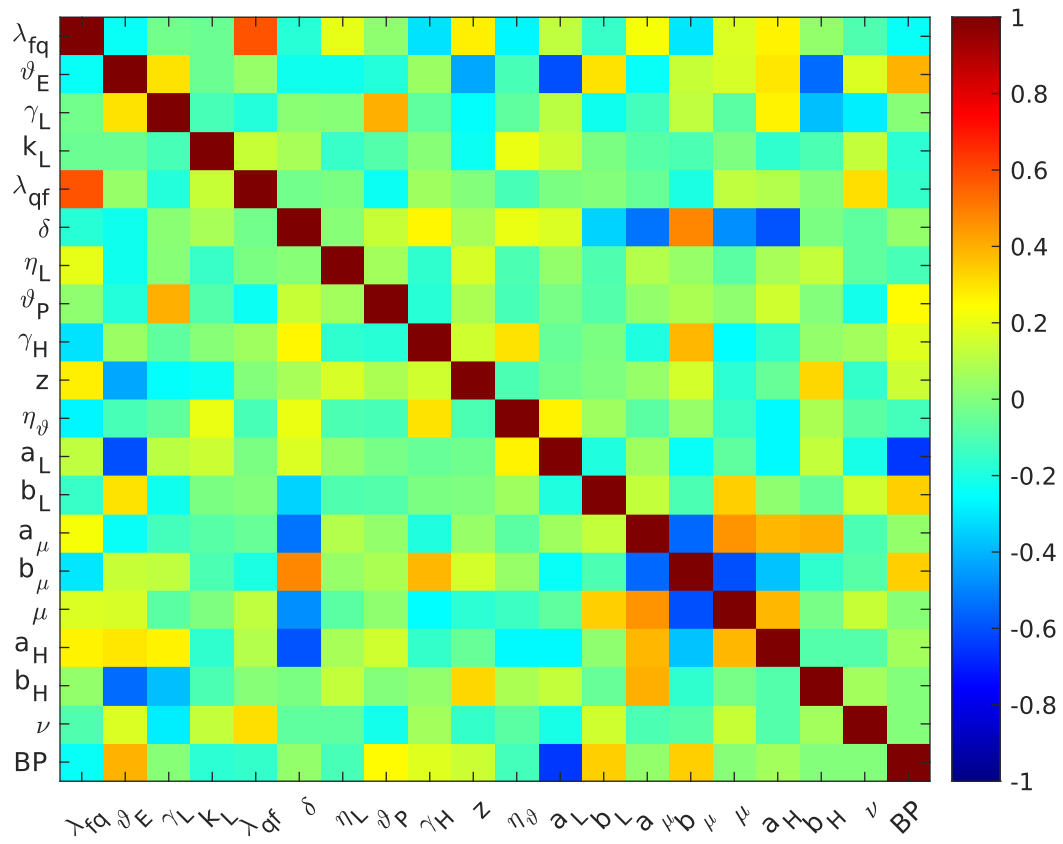
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

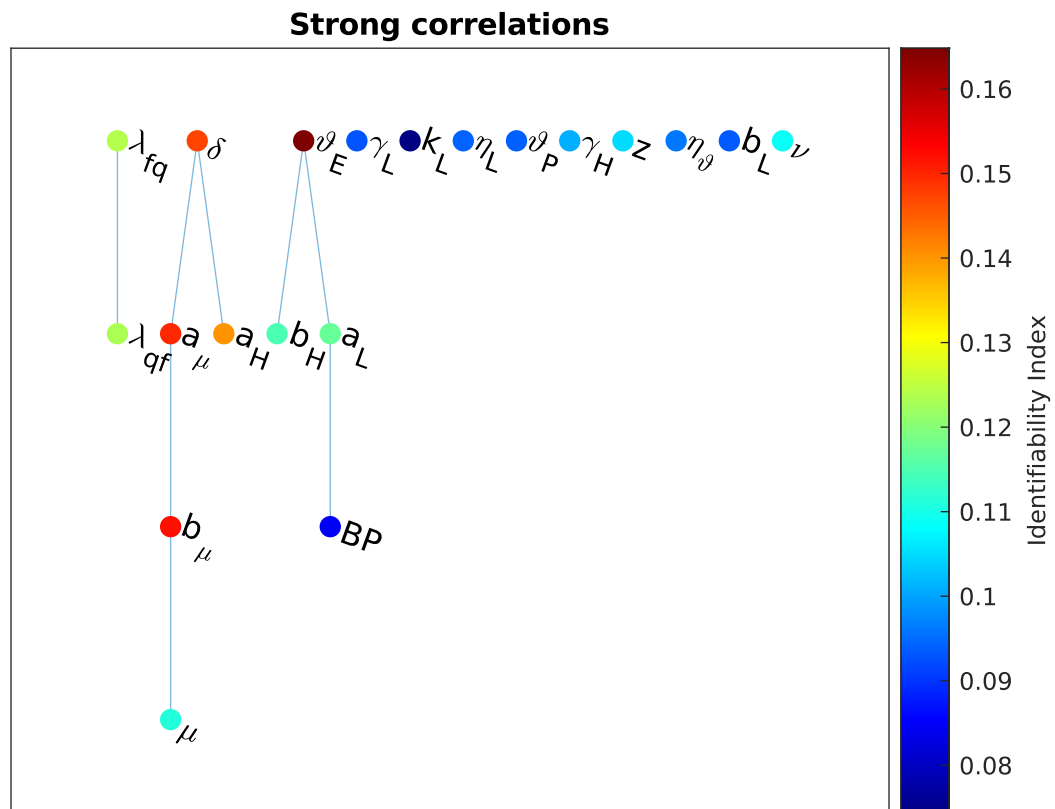
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|-----------|----------|
| λ_{fq} | '0.9697' | '0.9942' | '0.0122' | '0.9926' | '0.1241' |
| ϑ_E | '0' | '0.0008' | '0.8924' | '0.0003' | '0.1648' |
| γ_L | '0.0891' | '0.1161' | '0.3832' | '0.1126' | '0.093' |
| k_L | '1.36' | '9.6544' | '5.4962' | '5.4452' | '0.0745' |
| λ_{qf} | '0.9787' | '0.9981' | '0.5359' | '0.9976' | '0.1232' |
| δ | '0.0337' | '0.1429' | '0.0765' | '0.0864' | '0.1475' |
| η_L | '0.0435' | '0.9513' | '0.4885' | '0.5819' | '0.0943' |
| ϑ_P | '0.0001' | '0.0002' | '0.0873' | '0.0001' | '0.094' |
| γ_H | '0.5332' | '0.9627' | '0.6272' | '0.7894' | '0.1011' |
| z | '12.7605' | '30' | '9.9891' | '29.7853' | '0.1048' |
| η_{ϑ} | '0.6272' | '0.6692' | '0.5735' | '0.6561' | '0.0961' |
| a_L | '2.8365' | '6.3773' | '1.3915' | '4.5514' | '0.1174' |
| b_L | '4.4494' | '10.003' | '10.3808' | '5.6141' | '0.0936' |
| a_{μ} | '3.8214' | '13.103' | '9.2604' | '11.3253' | '0.1497' |
| b_{μ} | '1.5607' | '13.6' | '8.5255' | '5.015' | '0.1519' |
| μ | '0' | '0.0586' | '0.0846' | '0.0283' | '0.1113' |
| a_H | '1.067' | '4.3522' | '7.1247' | '1.1305' | '0.1403' |
| b_H | '5.1798' | '14.4015' | '5.8679' | '11.7181' | '0.115' |
| ν | '68.9465' | '110.5165' | '159.9136' | '69.9273' | '0.109' |
| BP | '446.4767' | '453.2566' | '450.5' | '446.5' | '0.0848' |

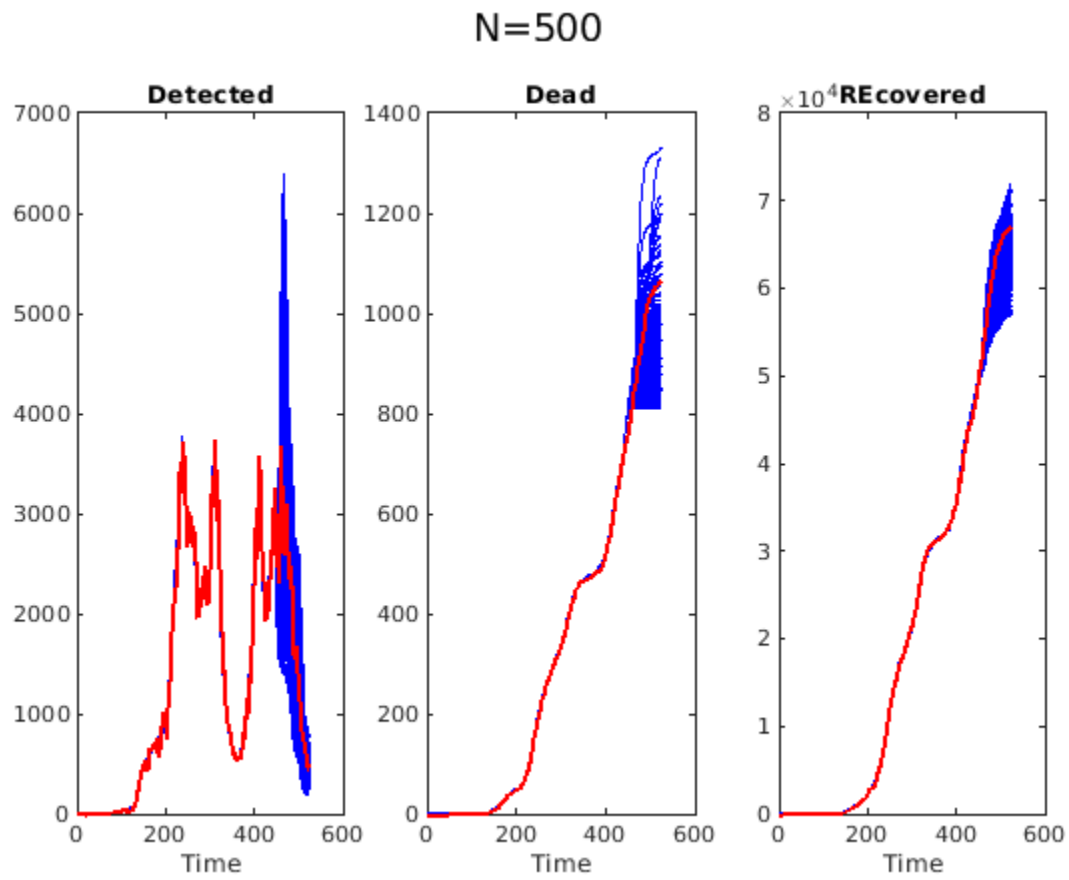
11.3. Identifiability analysis







11.4. Uncertainty analysis



Chapter 12. Extension number12

12.1. Basic information

The extension to be validated consists of the time series from the data526 to the 575. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

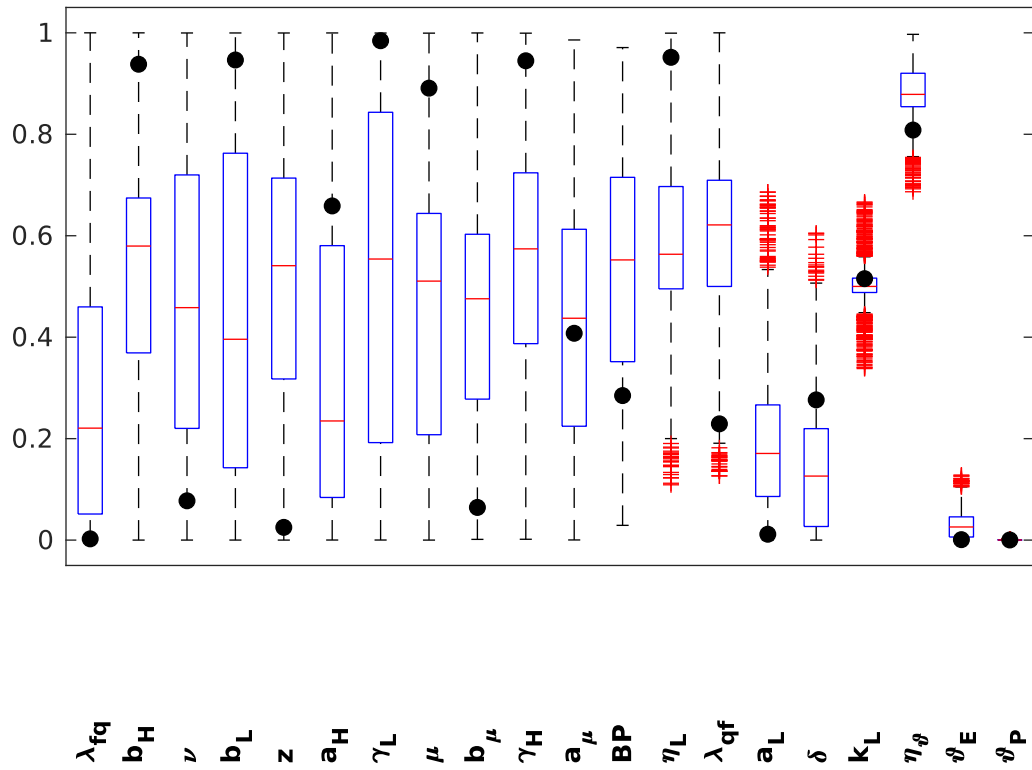
12.2. Estimated parameters with their intervals

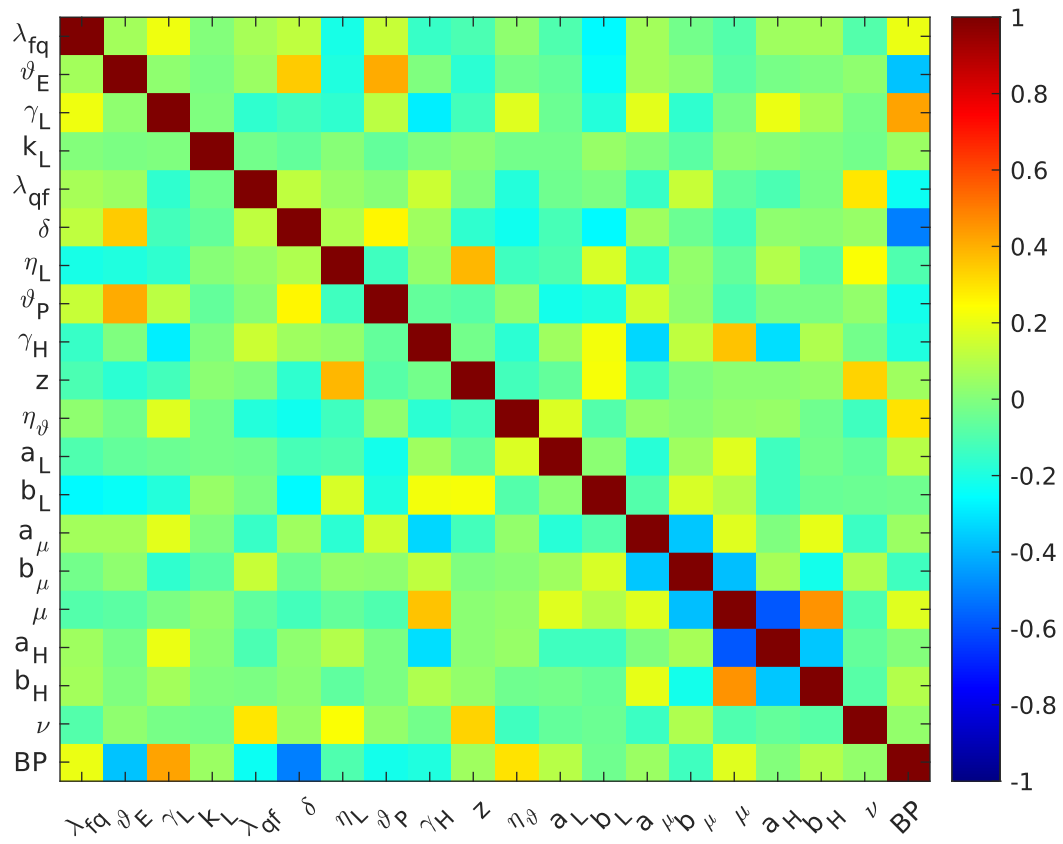
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

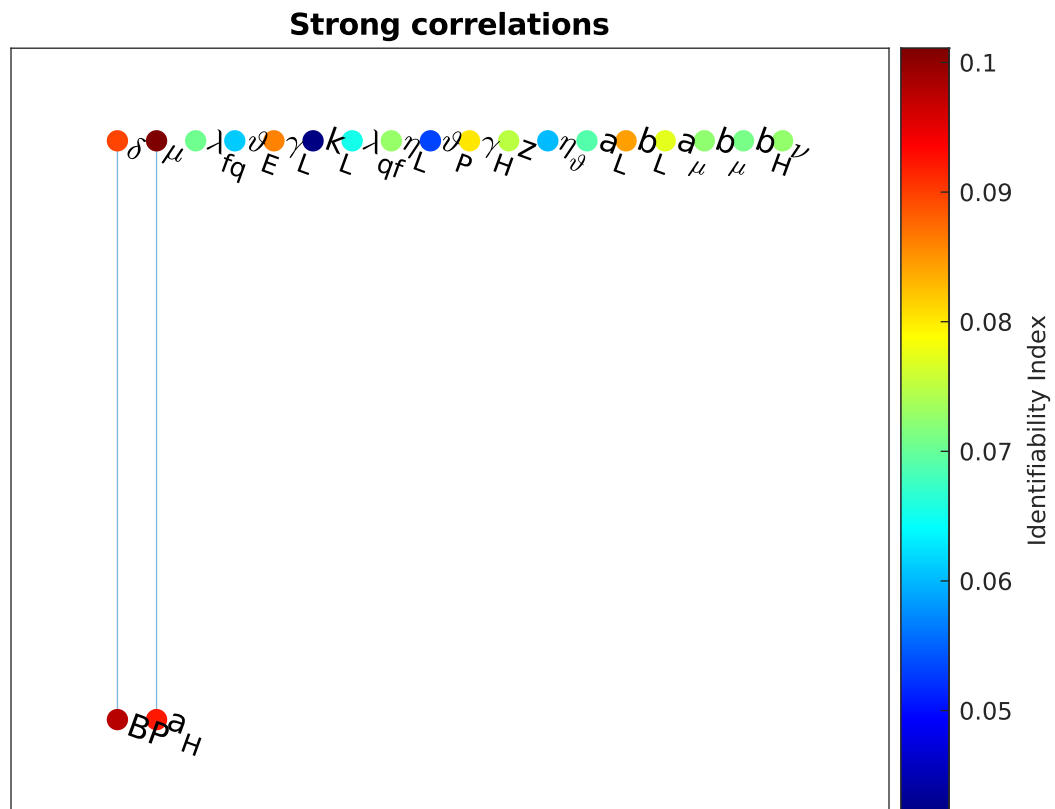
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|-----------|----------|
| λ_{fq} | '0' | '0.0048' | '0.2207' | '0.0024' | '0.0706' |
| ϑ_E | '0.0002' | '0.0019' | '0.0259' | '0.0009' | '0.0612' |
| γ_L | '0.6799' | '0.9872' | '0.5541' | '0.9844' | '0.086' |
| k_L | '1.3685' | '8.5078' | '5.5007' | '5.6379' | '0.0422' |
| λ_{qf} | '0.2079' | '0.7865' | '0.6212' | '0.2292' | '0.0654' |
| δ | '0.0296' | '0.0427' | '0.019' | '0.0415' | '0.0897' |
| η_L | '0.5246' | '1' | '0.5635' | '0.9517' | '0.0728' |
| ϑ_P | '0' | '0.0005' | '0.0002' | '0.0002' | '0.0533' |
| γ_H | '0.297' | '1' | '0.5741' | '0.9449' | '0.0804' |
| z | '0.5769' | '0.8221' | '16.2287' | '0.7531' | '0.075' |
| η_{ϑ} | '0.7546' | '1' | '0.8786' | '0.8083' | '0.0603' |
| a_L | '1.0685' | '2.5395' | '3.3937' | '1.1615' | '0.0689' |
| b_L | '8.7989' | '14.6763' | '6.5427' | '14.2504' | '0.0844' |
| a_{μ} | '6.6002' | '12.1759' | '7.1229' | '6.7079' | '0.0772' |
| b_{μ} | '1.1028' | '4.5756' | '7.6606' | '1.9013' | '0.0724' |
| μ | '0.019' | '0.95' | '0.5106' | '0.8909' | '0.1011' |
| a_H | '8.4907' | '12.8607' | '4.2882' | '10.2226' | '0.0922' |
| b_H | '8.8677' | '15' | '9.1152' | '14.1329' | '0.0711' |
| ν | '37.1586' | '67.642' | '229.1268' | '38.7281' | '0.0726' |
| BP | '502.6742' | '515.5964' | '526.5' | '503.5' | '0.0977' |

12.3. Identifiability analysis

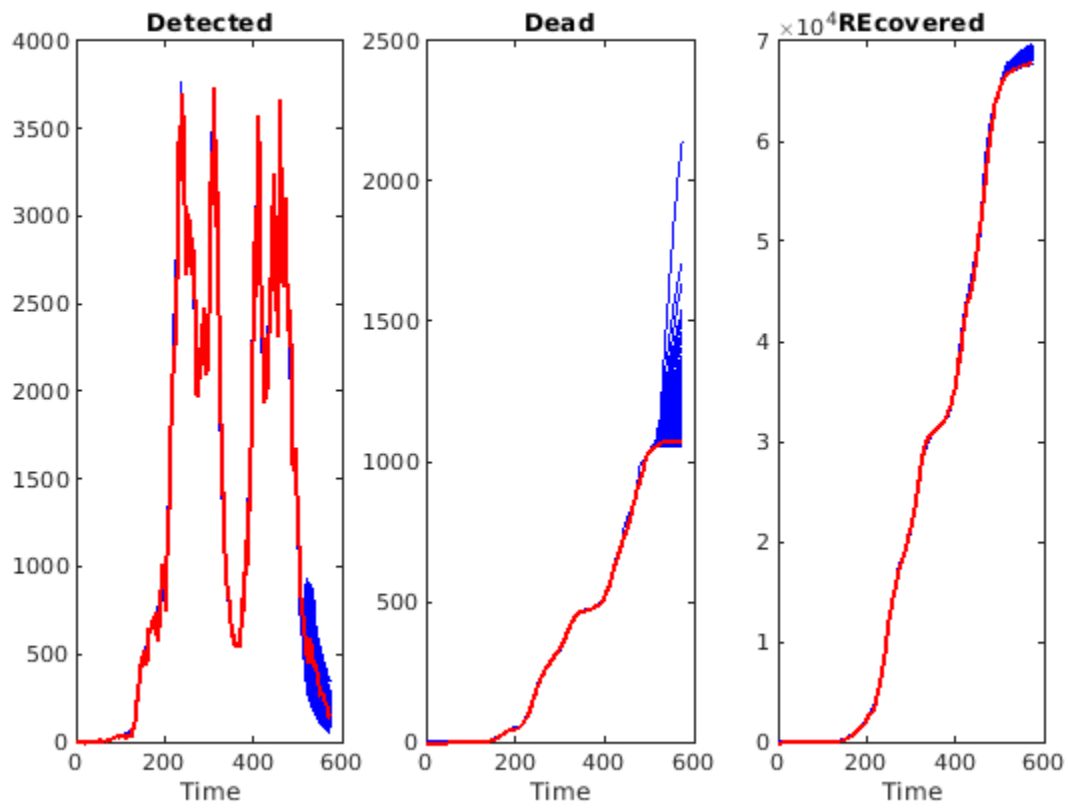






12.4. Uncertainty analysis

N=500



Chapter 13. Extension number13

13.1. Basic information

The extension to be validated consists of the time series from the data575 to the 721. The status of the validation is: COMPLETED.

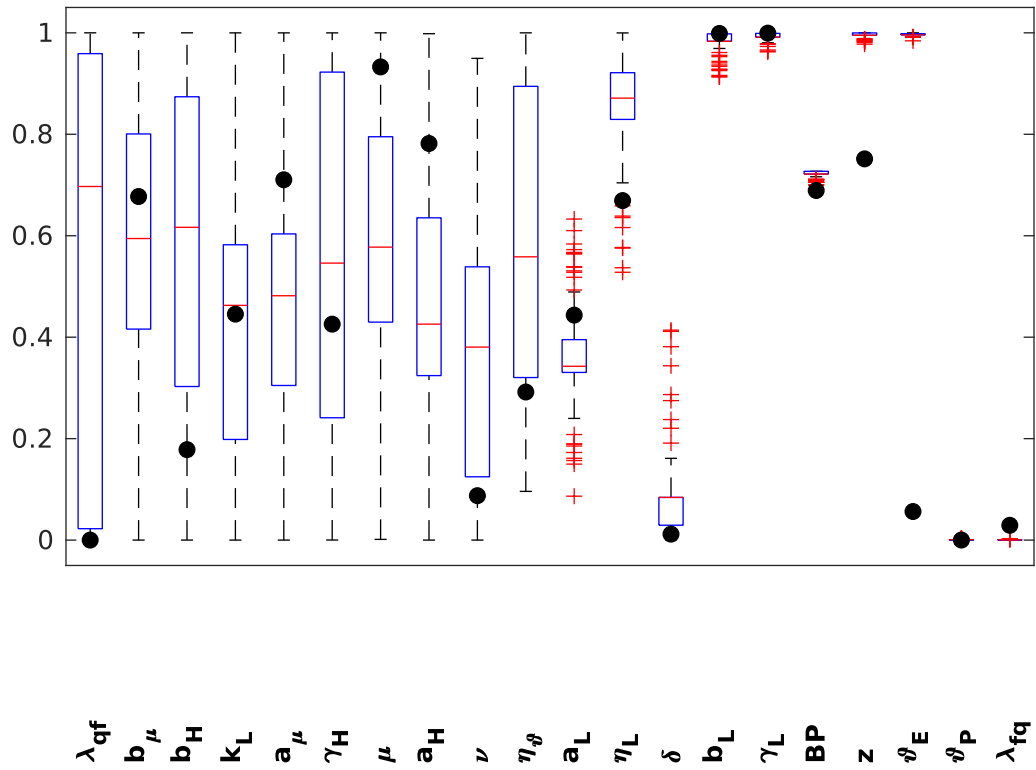
The number of estimations needed to perform the validation was1000.

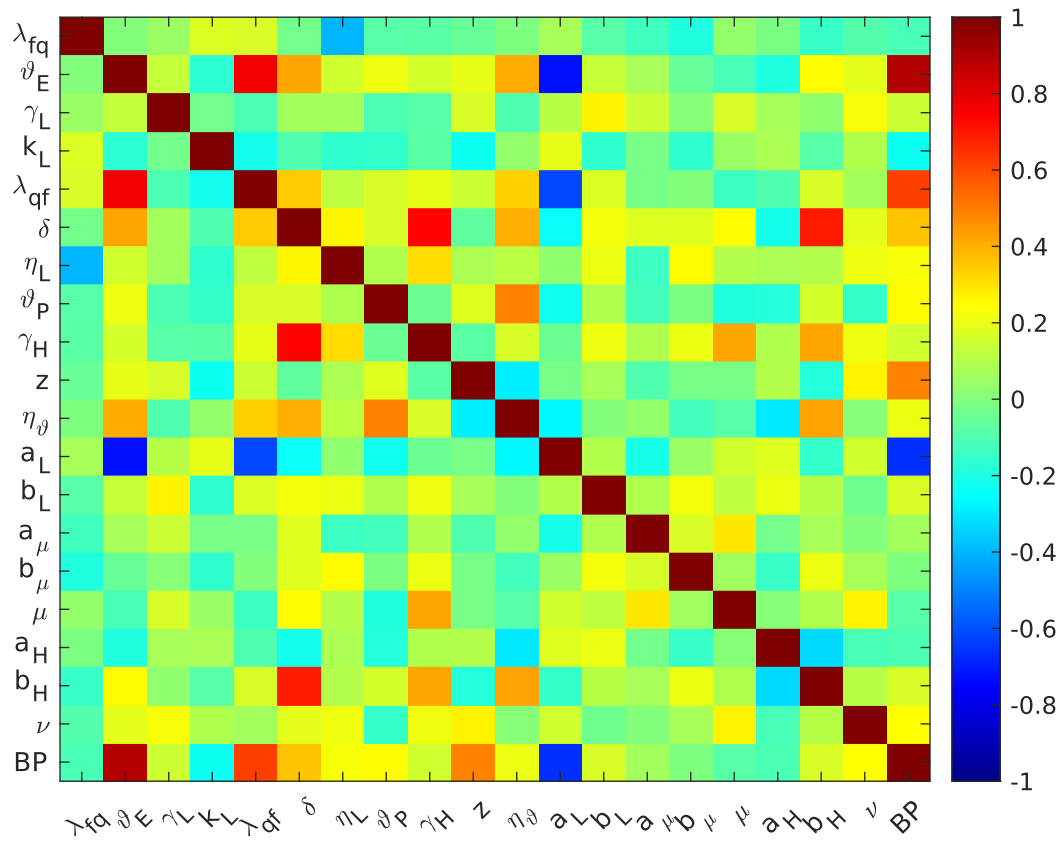
13.2. Estimated parameters with their intervals

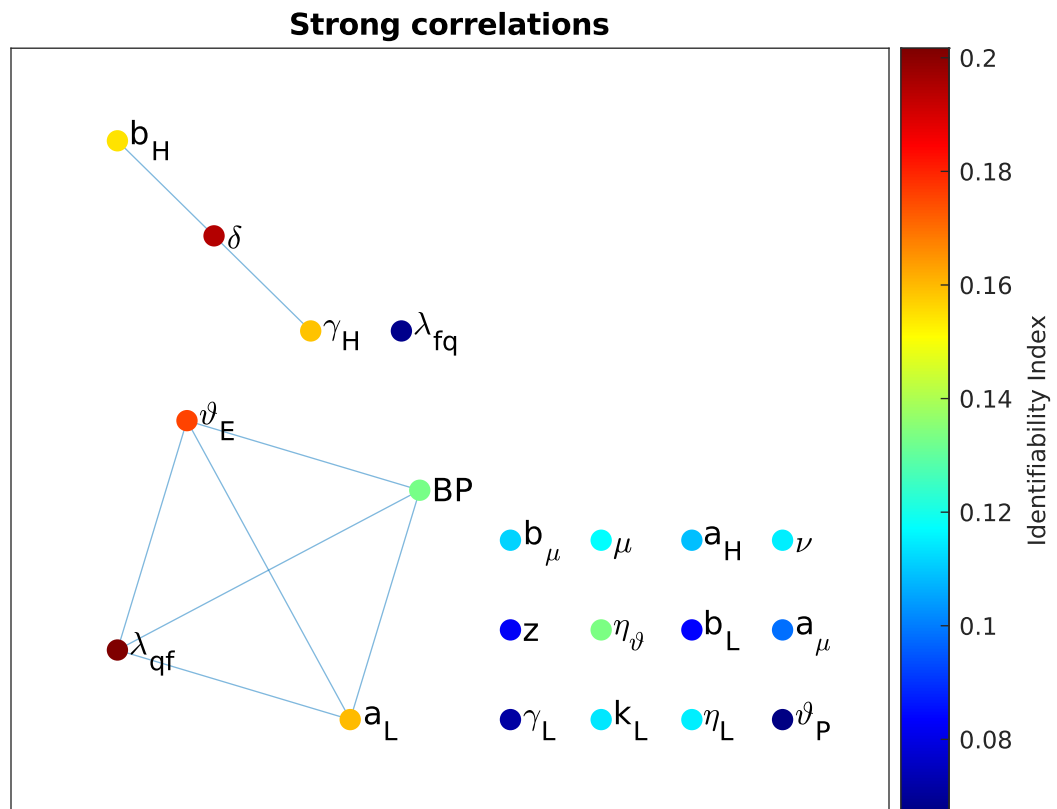
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

| | Rango | | Nominal | Mejor | Index |
|--------------------|------------|------------|------------|-----------|----------|
| λ_{fq} | '0' | '0.0393' | '0.0005' | '0.0292' | '0.0684' |
| ϑ_E | '0.9049' | '1' | '0.996' | '0.0564' | '0.1758' |
| γ_L | '0.9584' | '1' | '0.9915' | '0.9994' | '0.0716' |
| k_L | '4.6337' | '5.6955' | '5.1646' | '5.0091' | '0.1141' |
| λ_{qf} | '0.6139' | '0.7803' | '0.6971' | '0' | '0.2017' |
| δ | '0.0006' | '0.0247' | '0.0126' | '0.0018' | '0.1948' |
| η_L | '0.8201' | '0.9224' | '0.8713' | '0.6693' | '0.115' |
| ϑ_P | '0' | '0.0074' | '0.0006' | '0.0001' | '0.0672' |
| γ_H | '0.4719' | '0.6202' | '0.546' | '0.4257' | '0.1589' |
| z | '28.6228' | '30' | '29.8568' | '22.5457' | '0.0824' |
| η_{ϑ} | '0.4974' | '0.6194' | '0.5584' | '0.2919' | '0.1335' |
| a_L | '5.1648' | '6.43' | '5.7974' | '7.2092' | '0.16' |
| b_L | '14.3029' | '15' | '14.7671' | '14.9829' | '0.0835' |
| a_{μ} | '7.0585' | '8.429' | '7.7438' | '10.9446' | '0.0985' |
| b_{μ} | '8.4866' | '10.1591' | '9.3228' | '10.4824' | '0.1115' |
| μ | '0.5181' | '0.637' | '0.5775' | '0.9328' | '0.1175' |
| a_H | '6.2301' | '7.6902' | '6.9601' | '11.9459' | '0.1089' |
| b_H | '8.6752' | '10.59' | '9.6326' | '3.4966' | '0.1546' |
| ν | '162.0515' | '218.4118' | '190.2317' | '43.7787' | '0.1154' |
| BP | '658.4369' | '660.5631' | '659.5' | '653.5' | '0.1334' |

13.3. Identifiability analysis







13.4. Uncertainty analysis

N=500

