Validation process forIBAGUE

The epidemiology research group, EAFIT

06-Apr-2022

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Chapter 1. Extension number1

1.1. Basic information

The extension to be validated consists of the time series from the data1 to the 127. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

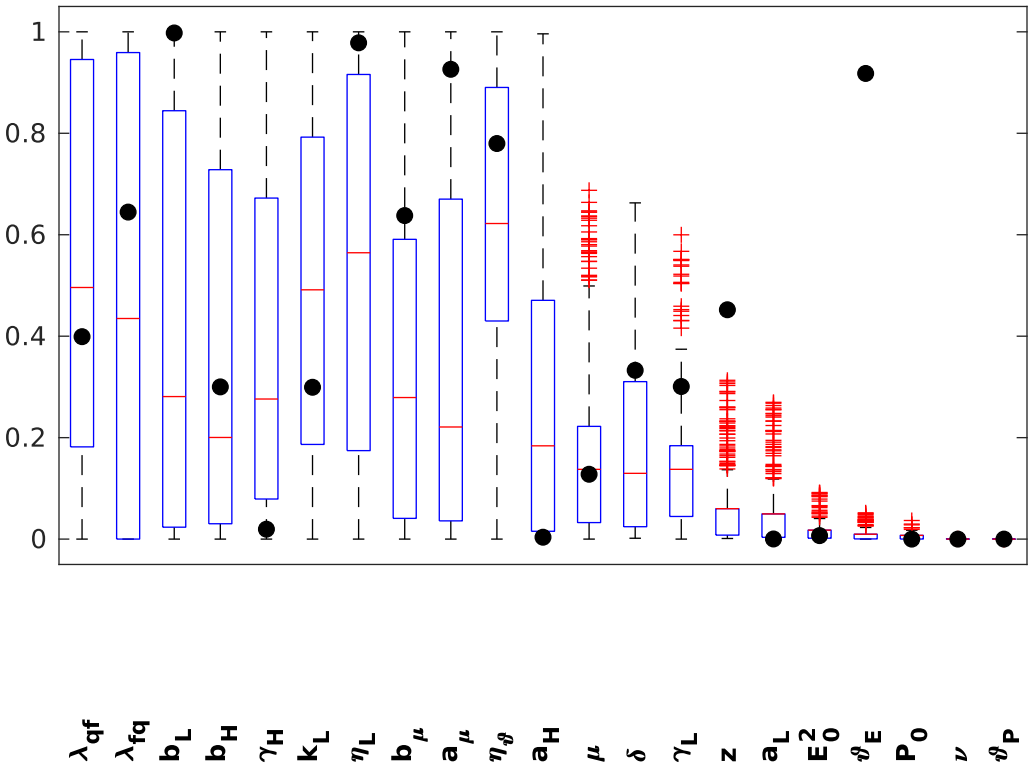
1.2. Estimated parameters with their intervals

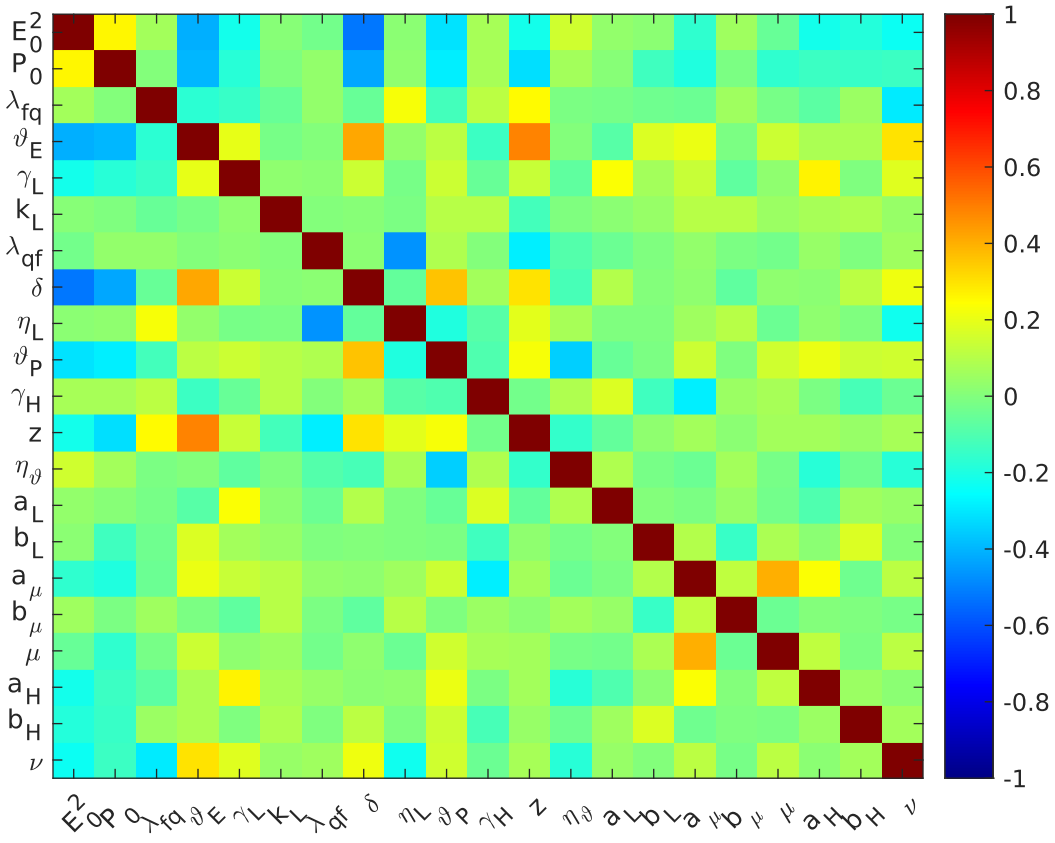
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
E^2_0	'12.6713'	'15.3651'	'35.3374'	'13.7241'	'0.1018'
P_0	'0'	'0.0001'	'2.9355'	'0'	'0.086'
\lambda_{fq}	'0.6236'	'0.6582'	'0.4349'	'0.6447'	'0.1037'
\vartheta_E	'0.9137'	'0.9185'	'0.0096'	'0.918'	'0.0926'
\gamma_L	'0.2818'	'0.3019'	'0.1376'	'0.3008'	'0.0867'
k_L	'1.98'	'8.2135'	'5.4227'	'3.6938'	'0.0809'
\lambda_{qf}	'0.3973'	'0.4143'	'0.496'	'0.399'	'0.0876'
\delta	'0.0362'	'0.0522'	'0.0194'	'0.0499'	'0.1076'
\eta_L	'0.9057'	'0.9825'	'0.5645'	'0.9783'	'0.0959'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0813'
\gamma_H	'0.0025'	'0.0223'	'0.2761'	'0.0195'	'0.0931'
z	'13.0695'	'13.6516'	'1.8001'	'13.5631'	'0.1034'
\eta_\vartheta	'0.4634'	'1'	'0.6221'	'0.7798'	'0.0841'
a_L	'1.0026'	'1.0942'	'1.6952'	'1.0033'	'0.0764'
b_L	'13.539'	'15'	'4.9336'	'14.9686'	'0.0911'
a_\mu	'7.4742'	'15'	'4.0941'	'13.966'	'0.1008'
b_\mu	'5.1306'	'11.6847'	'4.9069'	'9.9291'	'0.0827'
\mu	'0.0611'	'0.1933'	'0.1375'	'0.1278'	'0.0851'
a_H	'1'	'10.6248'	'3.5743'	'1.0519'	'0.0945'
b_H	'2.6809'	'15'	'3.8049'	'5.201'	'0.0901'
\nu	'0.0014'	'0.0101'	'0.0556'	'0.0052'	'0.074'

1.3. Identifiability analisys




E_0^2
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γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
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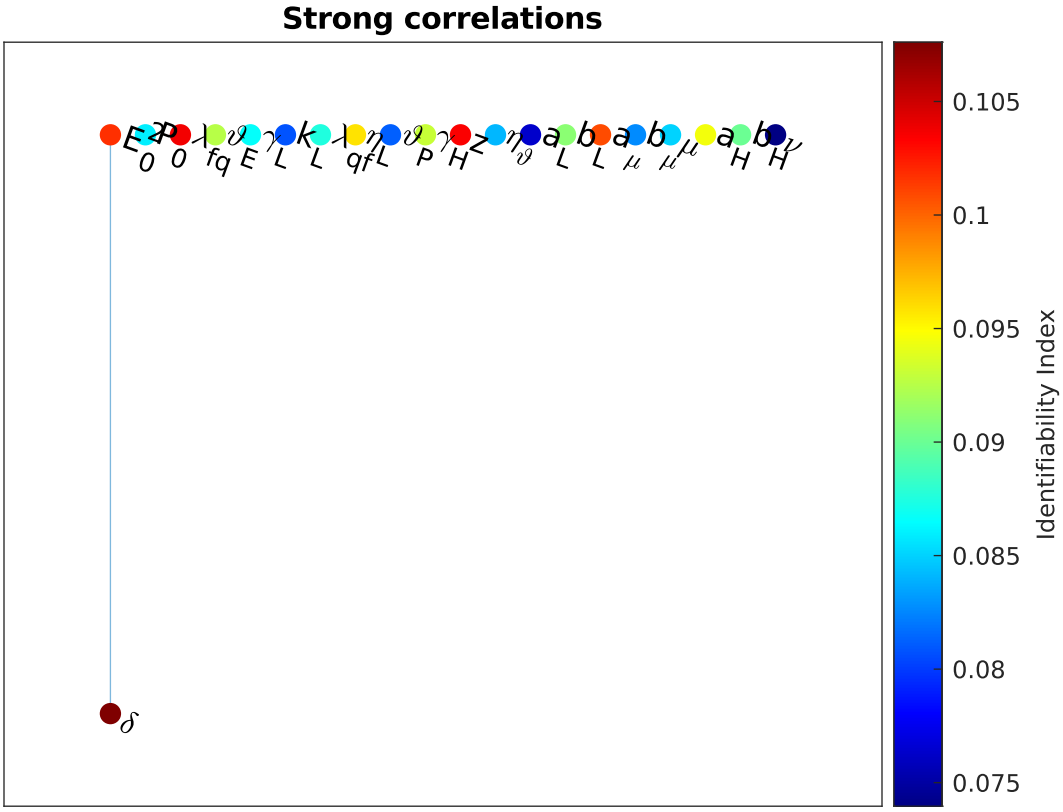
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
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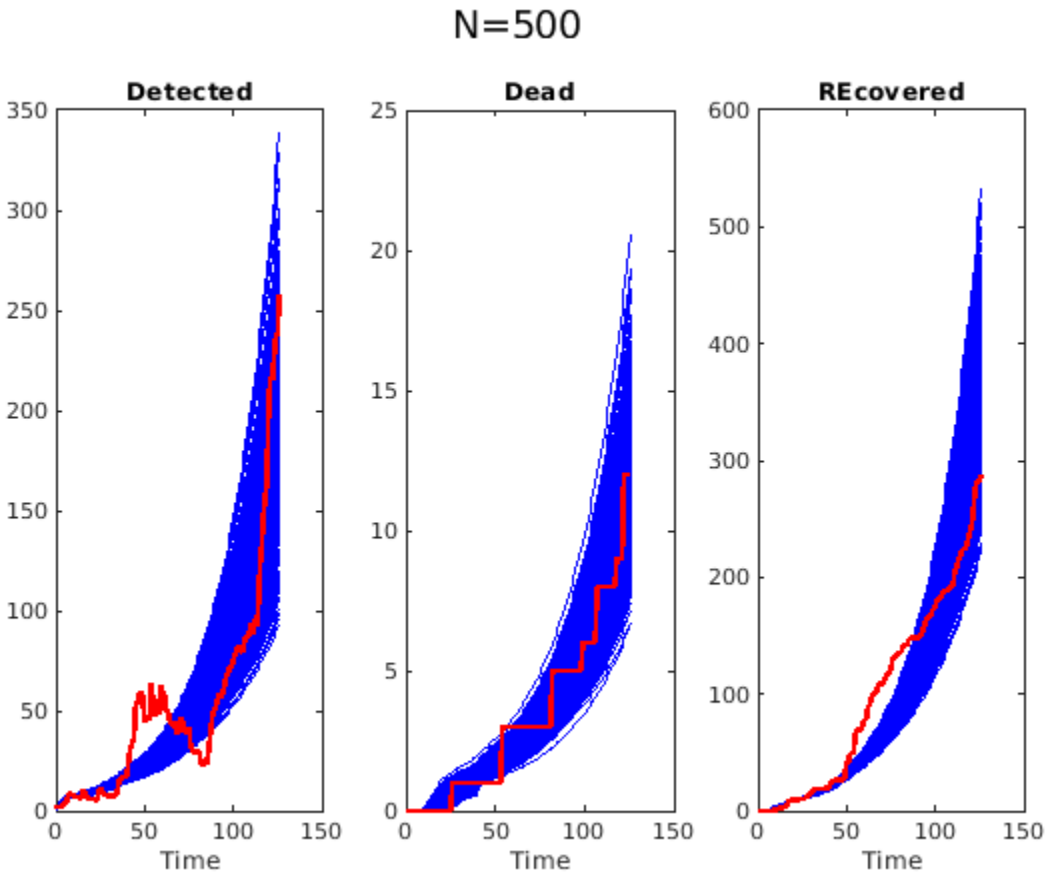
0.1
0.095
0.09
0.085
0.08
0.075

1.4. Uncertainty analisys



Chapter 2. Extension number2

2.1. Basic information

The extension to be validated consists of the time series from the data127 to the 155. The status of the validation is: COMPLETED.

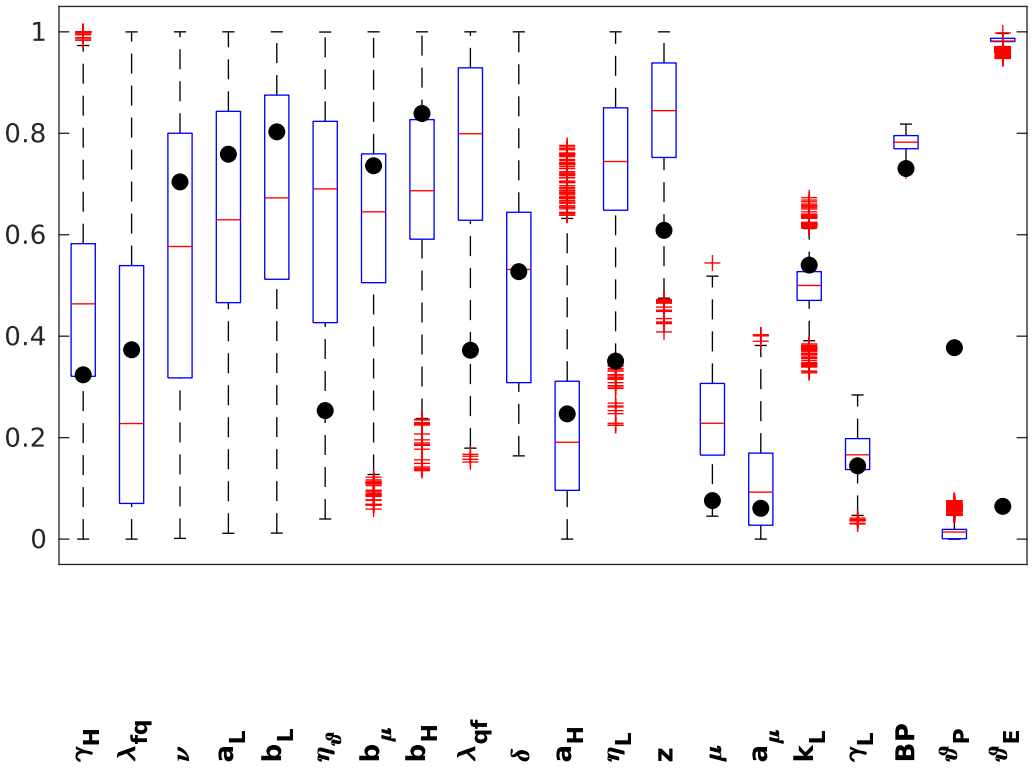
The number of estimations needed to perform the validation was1000.

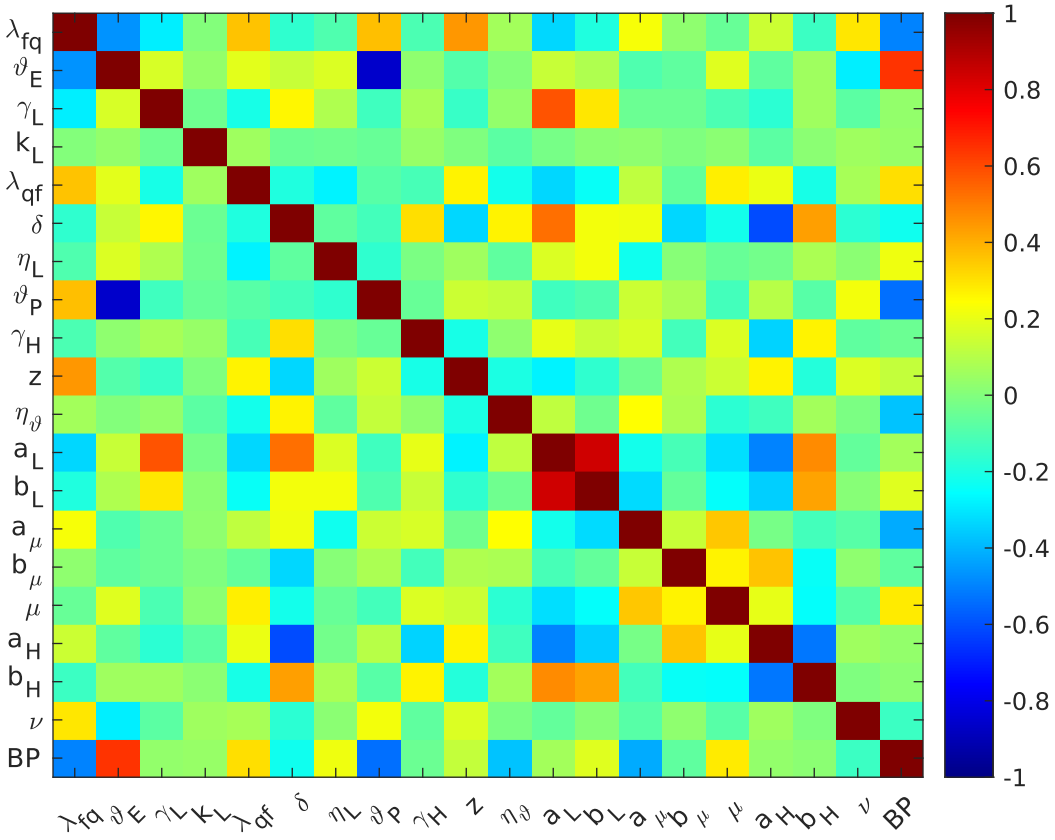
2.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.2038'	'0.2517'	'0.2278'	'0.3732'	'0.1024'
\vartheta_E	'0.9658'	'0.9979'	'0.9818'	'0.0646'	'0.1131'
\gamma_L	'0.1609'	'0.1714'	'0.1661'	'0.1445'	'0.0781'
k_L	'5.4127'	'5.5877'	'5.5002'	'5.8615'	'0.0429'
\lambda_{qf}	'0.78'	'0.8182'	'0.7991'	'0.3723'	'0.0915'
\delta	'0.0774'	'0.0821'	'0.0797'	'0.0791'	'0.1262'
\eta_L	'0.7263'	'0.7624'	'0.7444'	'0.3509'	'0.0687'
\vartheta_P	'0.0043'	'0.0235'	'0.0139'	'0.3773'	'0.1046'
\gamma_H	'0.4472'	'0.4803'	'0.4638'	'0.3239'	'0.0725'
z	'24.9582'	'25.7164'	'25.3373'	'18.261'	'0.0796'
\eta_\vartheta	'0.6693'	'0.7113'	'0.6903'	'0.2534'	'0.0751'
a_L	'9.5411'	'10.084'	'9.8126'	'11.6227'	'0.1491'
b_L	'10.1539'	'10.6808'	'10.4173'	'12.2402'	'0.1082'
a_\mu	'2.1808'	'2.4138'	'2.2973'	'1.8502'	'0.0737'
b_\mu	'9.766'	'10.2981'	'10.032'	'11.3037'	'0.0712'
\mu	'0.2185'	'0.2381'	'0.2283'	'0.0759'	'0.0788'
a_H	'3.3793'	'3.9673'	'3.6733'	'4.4564'	'0.1233'
b_H	'10.3695'	'10.8595'	'10.6145'	'12.7461'	'0.1006'
\nu	'276.9367'	'299.8251'	'288.3809'	'352.0889'	'0.0718'
BP	'121.235'	'121.765'	'121.5'	'113.5'	'0.1049'

2.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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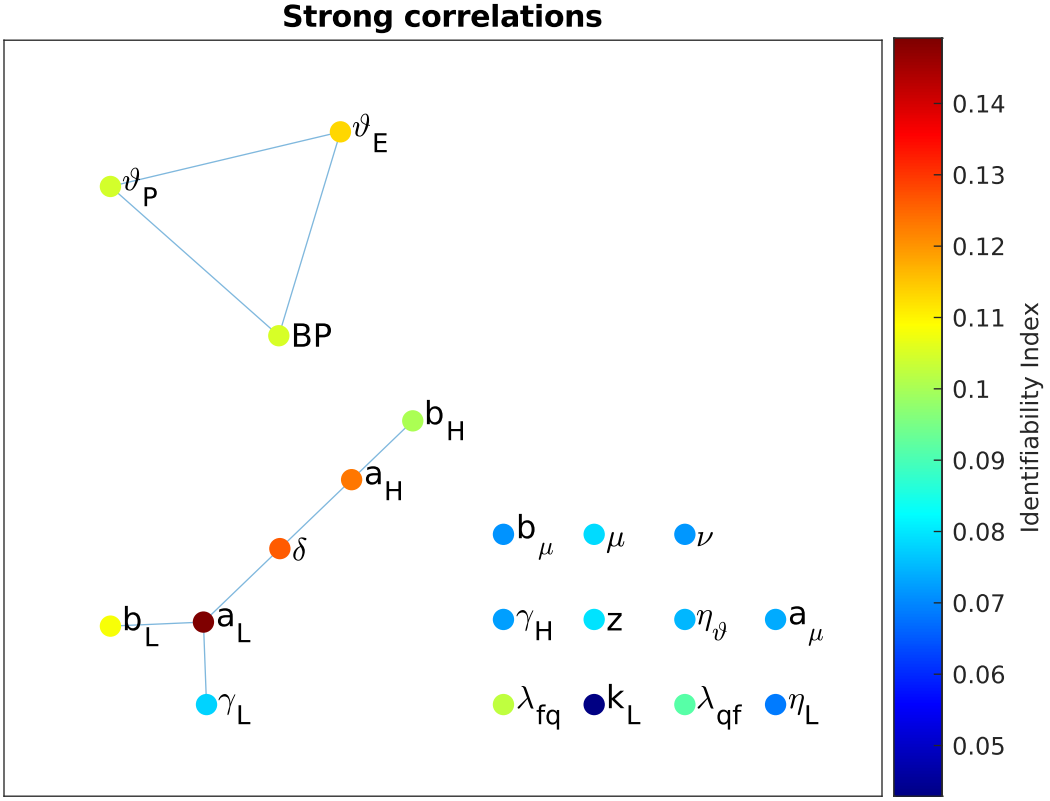
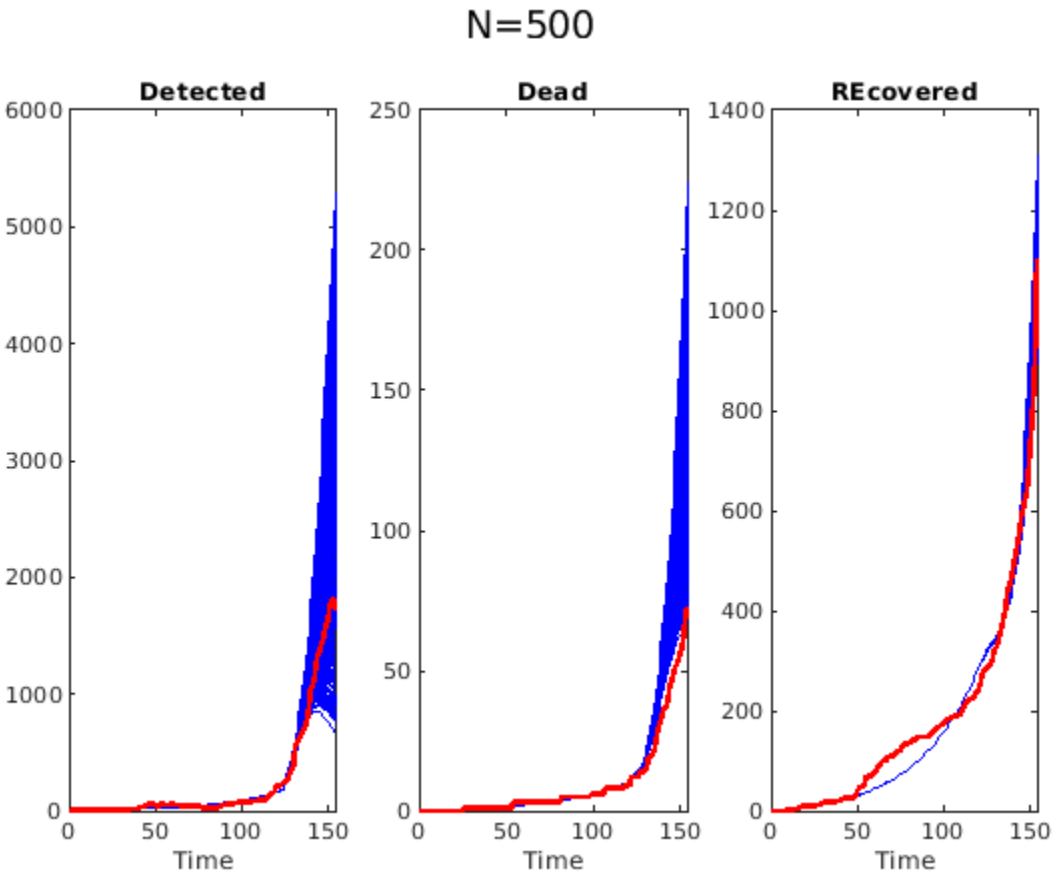
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
ϑ_E
ϑ_P
BP
b_H
a_H
δ
b_L
a_L
γ_L
b_μ
μ
ν
γ_H
z
η_ϑ
a_μ
λ_{fq}
k_L
λ_{qf}
η_L
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
Identifiability Index

2.4. Uncertainty analisys



Chapter 3. Extension number3

3.1. Basic information

The extension to be validated consists of the time series from the data155 to the 194. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

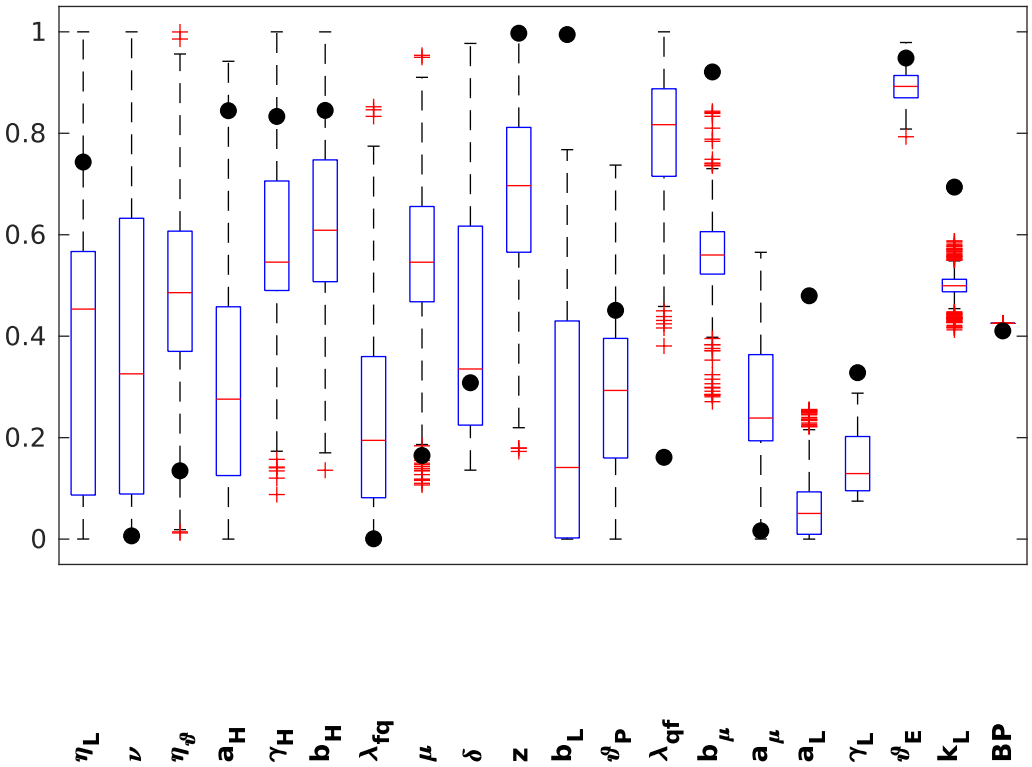
3.2. Estimated parameters with their intervals

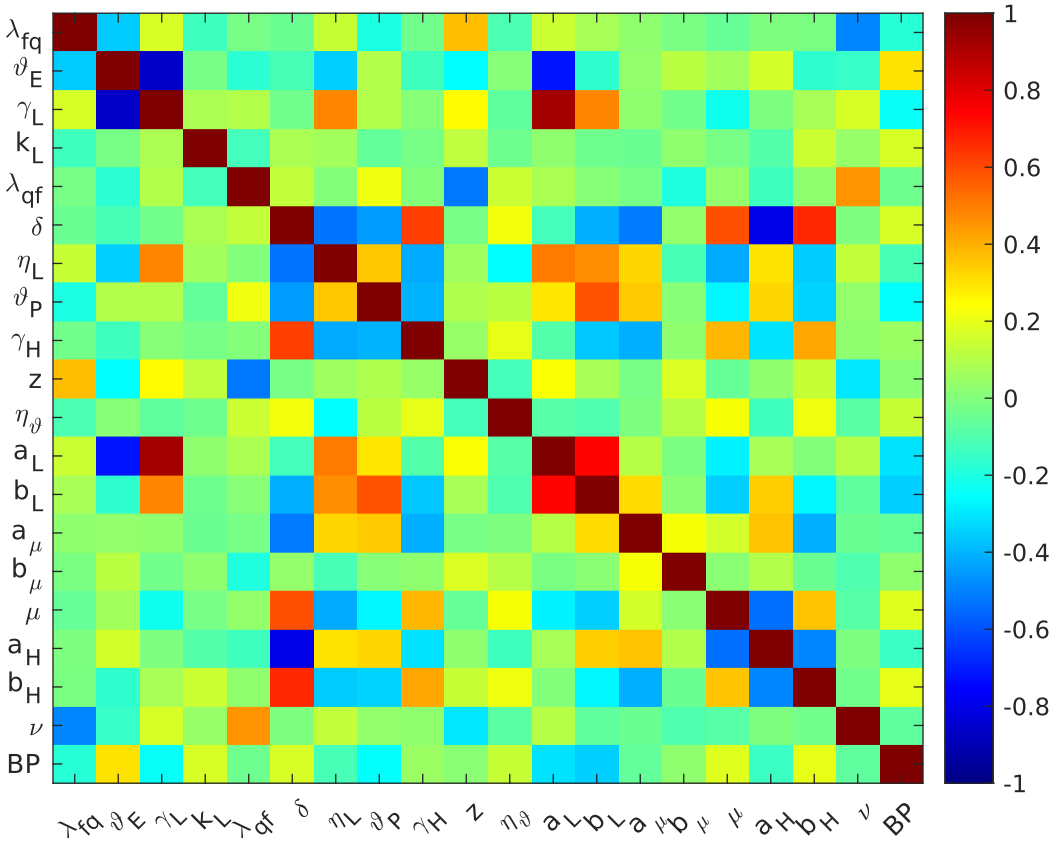
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0013'	'0.1947'	'0.0006'	'0.0849'
\vartheta_E	'0.9411'	'0.9501'	'0.8924'	'0.9483'	'0.118'
\gamma_L	'0.1994'	'0.3299'	'0.1291'	'0.3281'	'0.12'
k_L	'1.225'	'10'	'5.4948'	'7.2451'	'0.0529'
\lambda_{qf}	'0.1518'	'0.3184'	'0.817'	'0.1612'	'0.0952'
\delta	'0.0313'	'0.0465'	'0.0503'	'0.0462'	'0.2097'
\eta_L	'0'	'1'	'0.4534'	'0.7433'	'0.1502'
\vartheta_P	'0.4034'	'0.4803'	'0.293'	'0.451'	'0.1175'
\gamma_H	'0.0463'	'0.876'	'0.546'	'0.8332'	'0.112'
z	'27.4116'	'30'	'20.9038'	'29.9175'	'0.0978'
\eta_\vartheta	'0'	'0.2118'	'0.4858'	'0.1347'	'0.081'
a_L	'3.7819'	'7.9898'	'1.7077'	'7.7154'	'0.158'
b_L	'9.2166'	'15'	'2.9763'	'14.9246'	'0.1541'
a_\mu	'1'	'6.8528'	'4.3412'	'1.2291'	'0.0958'
b_\mu	'5.426'	'15'	'8.8408'	'13.8928'	'0.0634'
\mu	'0.111'	'0.2679'	'0.5458'	'0.1648'	'0.1292'
a_H	'5.8715'	'15'	'4.8624'	'12.8233'	'0.1311'
b_H	'2.5558'	'14.0916'	'9.5239'	'12.8316'	'0.1165'
\nu	'0.2718'	'6.8647'	'162.8871'	'3.1781'	'0.0939'
BP	'154.1451'	'157.6729'	'155.5'	'154.4997'	'0.0642'

3.3. Identifiability analisys




λ_{fq}
ϑ_E
γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
BP
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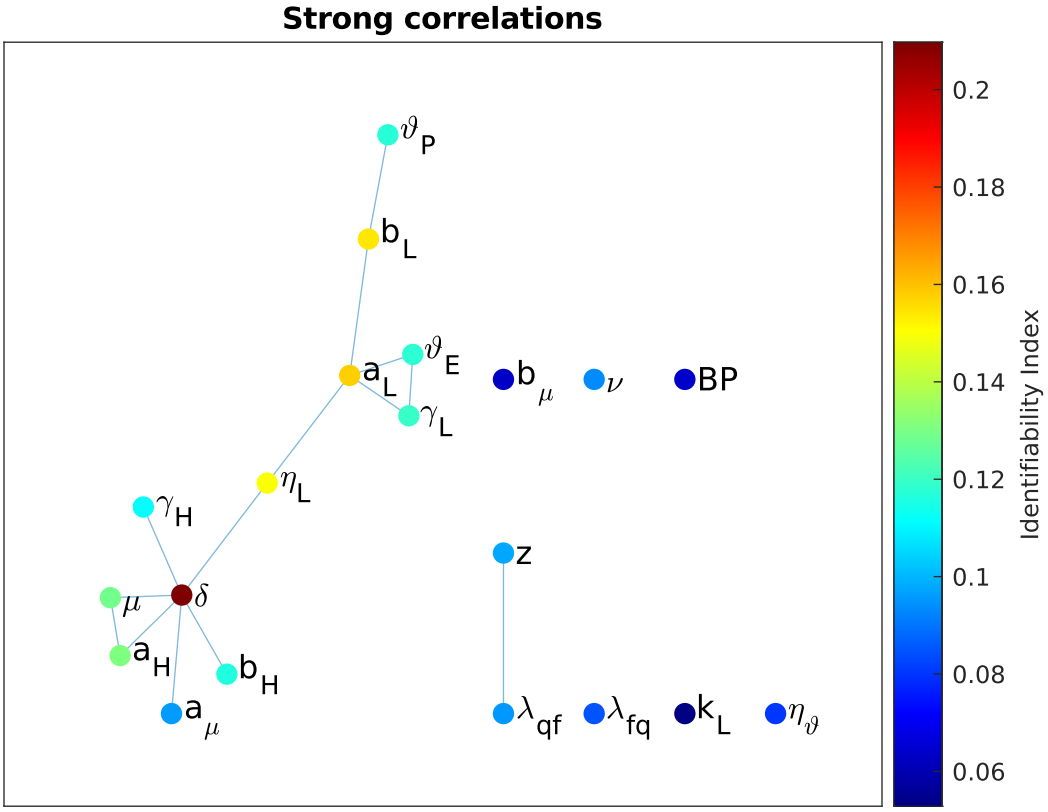
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
ϑ_P
b_L
a_L
ϑ_E
γ_L
b_μ
ν
BP
η_L
γ_H
z
μ
δ
a_H
b_H
a_μ
λ_{qf}
λ_{fq}
k_L
η_ϑ
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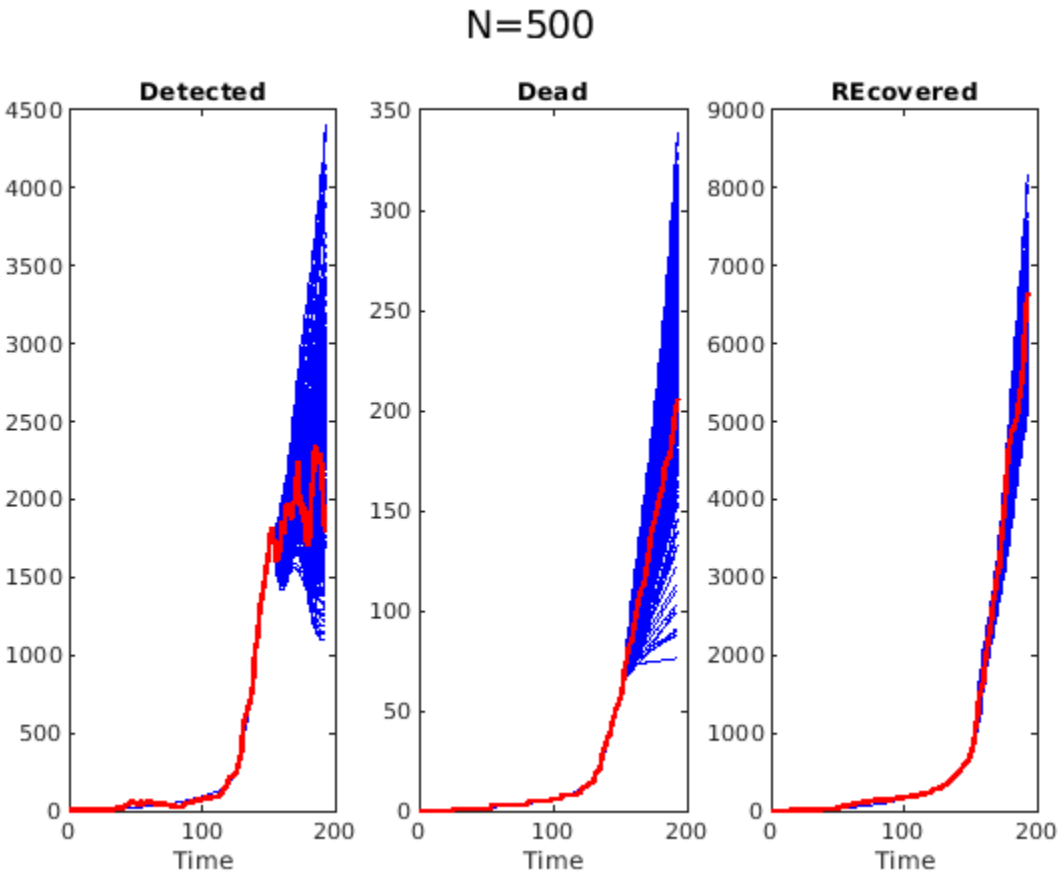
0.16
0.14
0.12
0.1
0.08
0.06
Identifiability Index

3.4. Uncertainty analisys



Chapter 4. Extension number4

4.1. Basic information

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

The number of estimations needed to perform the validation was1000.

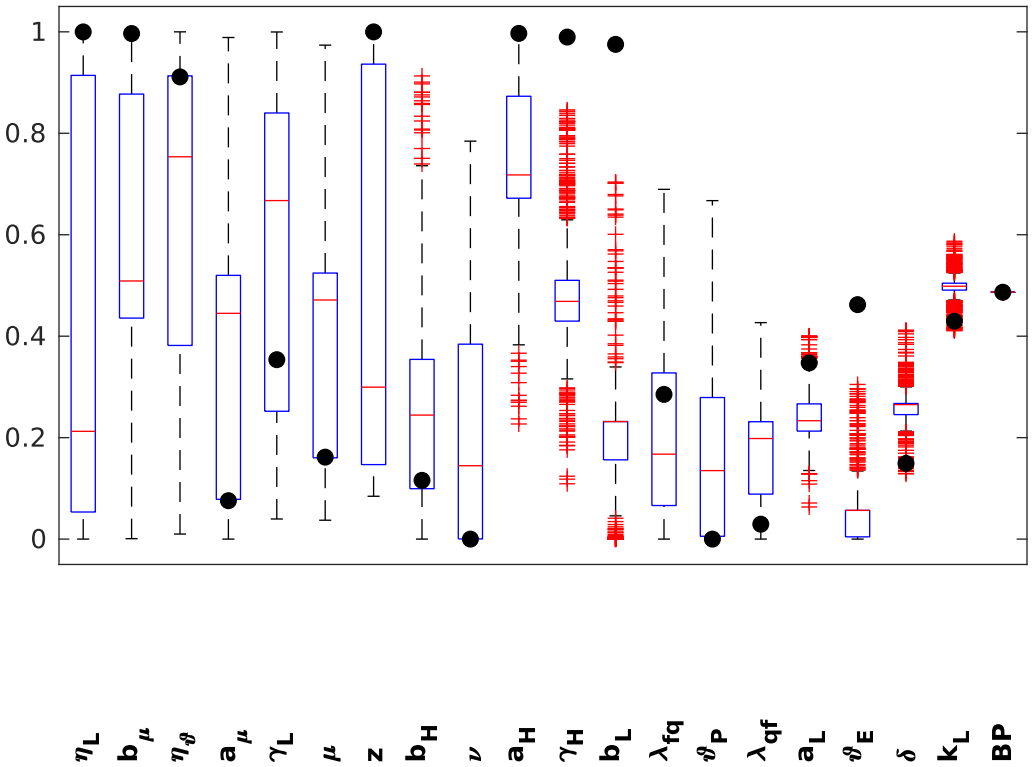
4.2. Estimated parameters with their intervals

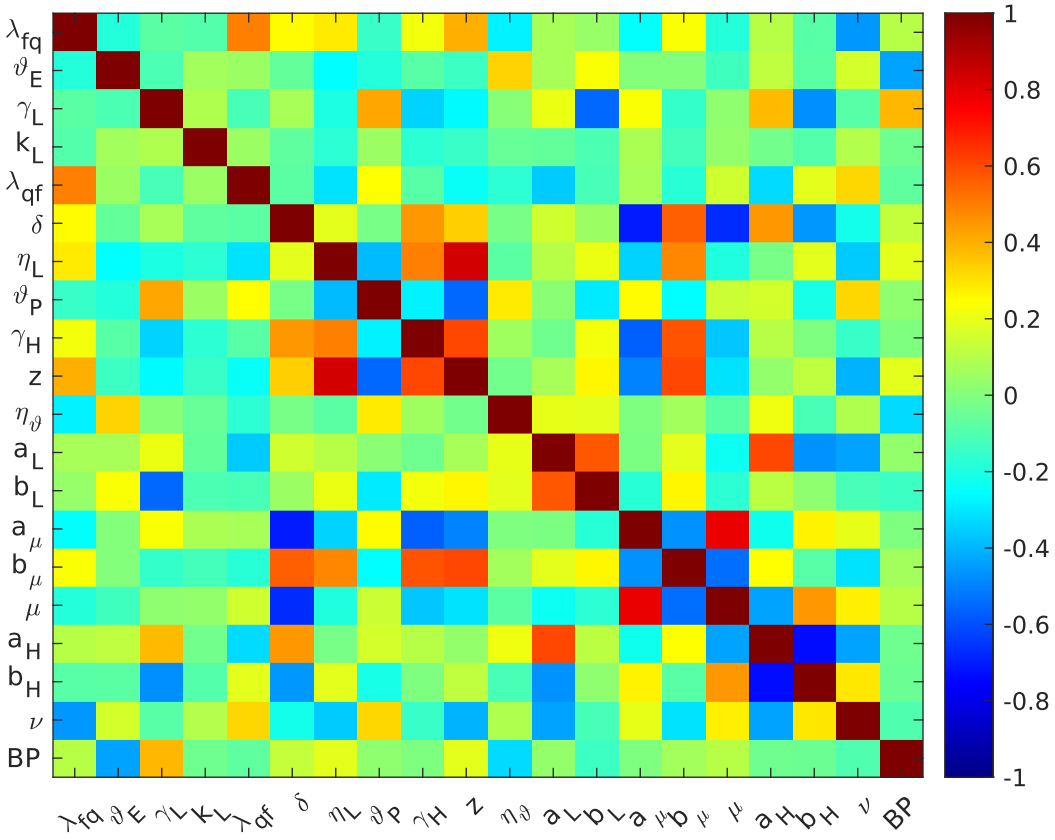
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.2708'	'0.2909'	'0.1674'	'0.2853'	'0.0985'
\vartheta_E	'0.3412'	'0.56'	'0.0567'	'0.4622'	'0.0832'
\gamma_L	'0.2322'	'0.472'	'0.6673'	'0.3537'	'0.1184'
k_L	'1.225'	'9.5613'	'5.4866'	'4.865'	'0.0561'
\lambda_{qf}	'0.0253'	'0.0311'	'0.1983'	'0.0294'	'0.0916'
\delta	'0.0027'	'0.027'	'0.0398'	'0.0224'	'0.1513'
\eta_L	'0.8971'	'1'	'0.2125'	'0.9998'	'0.1415'
\vartheta_P	'0'	'0'	'0.135'	'0'	'0.1053'
\gamma_H	'0.19'	'1'	'0.4686'	'0.9897'	'0.1437'
z	'25.6259'	'30'	'8.9857'	'29.9972'	'0.1844'
\eta_\vartheta	'0.2798'	'0.9624'	'0.7537'	'0.9111'	'0.0862'
a_L	'5.7748'	'7.9595'	'4.2671'	'5.863'	'0.1091'
b_L	'8.9773'	'15'	'4.2438'	'14.6537'	'0.1317'
a_\mu	'1.4486'	'9.6678'	'7.2307'	'2.0598'	'0.1487'
b_\mu	'8.5469'	'15'	'8.124'	'14.953'	'0.1662'
\mu	'0.1359'	'0.9637'	'0.4714'	'0.1616'	'0.1505'
a_H	'5.9674'	'15'	'11.0507'	'14.9565'	'0.1328'
b_H	'1'	'13.096'	'4.4224'	'2.6213'	'0.1166'
\nu	'0'	'0.001'	'72.3309'	'0.0004'	'0.1117'
BP	'190.8372'	'199.3391'	'191.5'	'191.5'	'0.056'

4.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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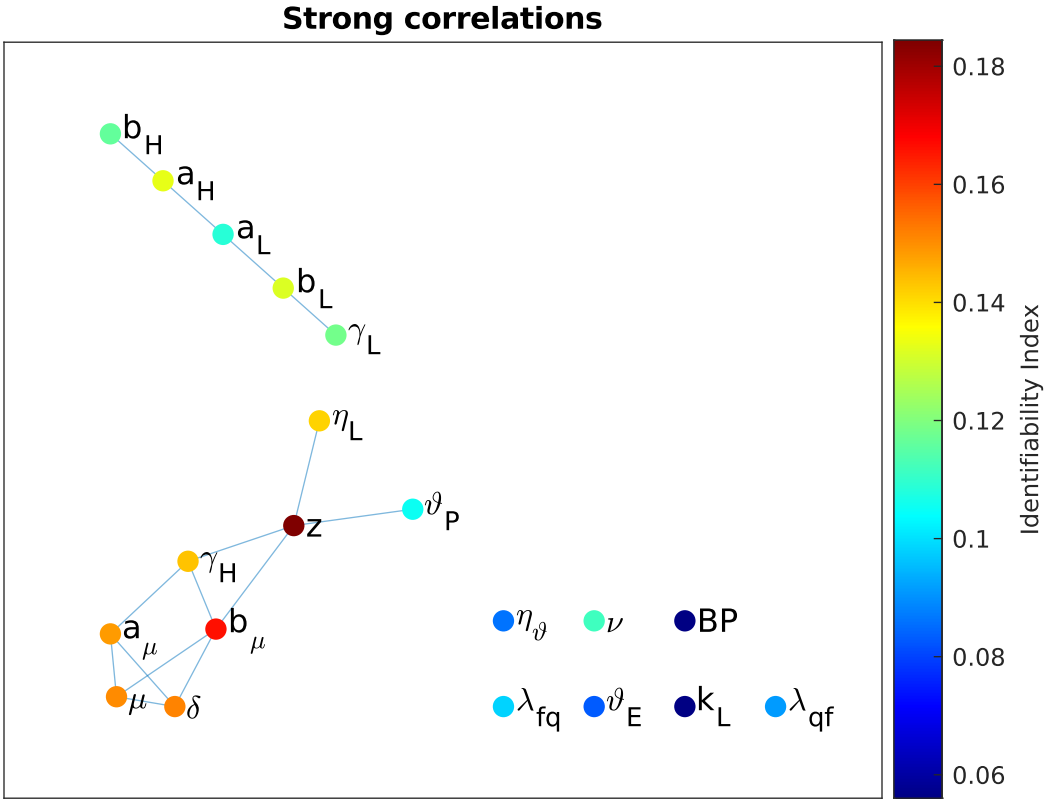
-0.4
-0.6
-0.8
-1


Strong correlations
b H
a H
a L
b L
γ L
η L
ϑ P
z
γ H
a μ
b μ
μ
δ
η ϑ
ν
BP
λ fq
ϑ E
k L
λ qf
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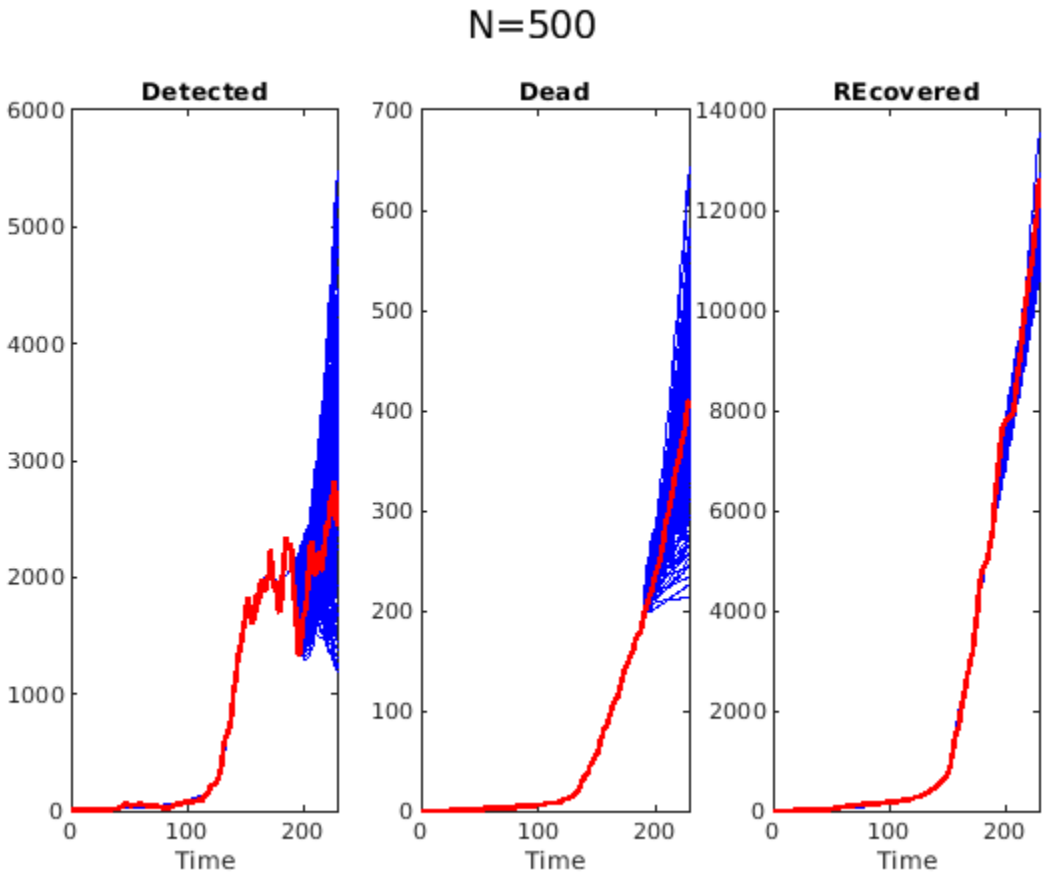
0.16
0.14
0.12
0.1
0.08
0.06
Identifiability Index

4.4. Uncertainty analisys



Chapter 5. Extension number5

5.1. Basic information

The extension to be validated consists of the time series from the data230 to the 271. The status of the validation is: COMPLETED.

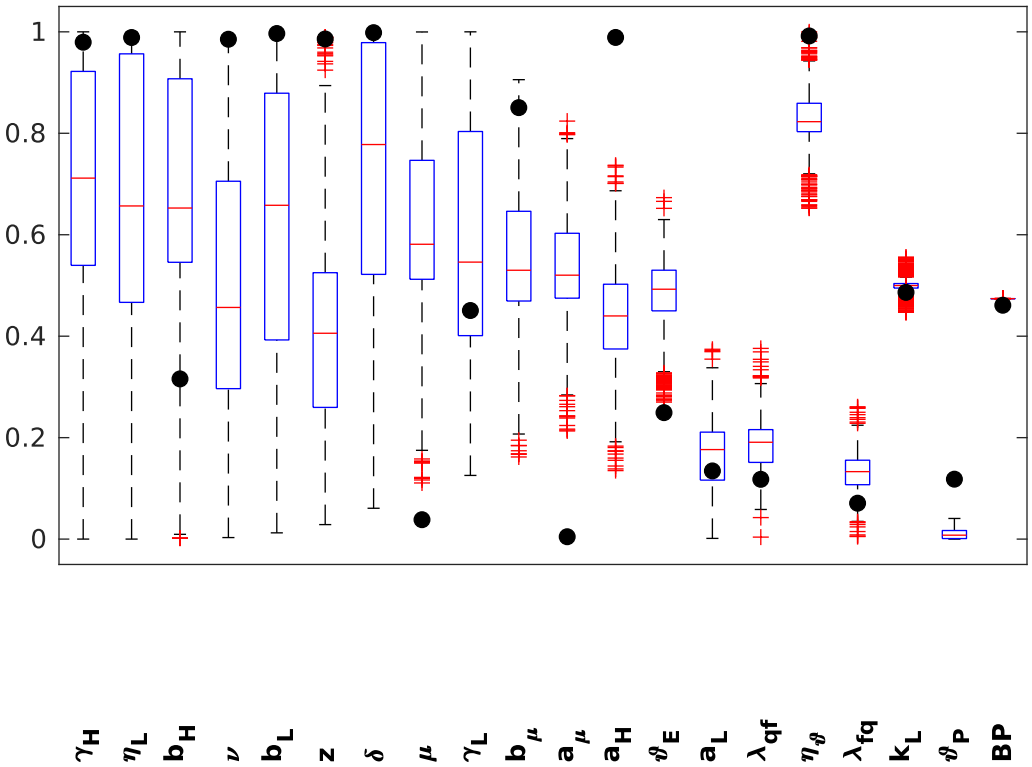
The number of estimations needed to perform the validation was1000.

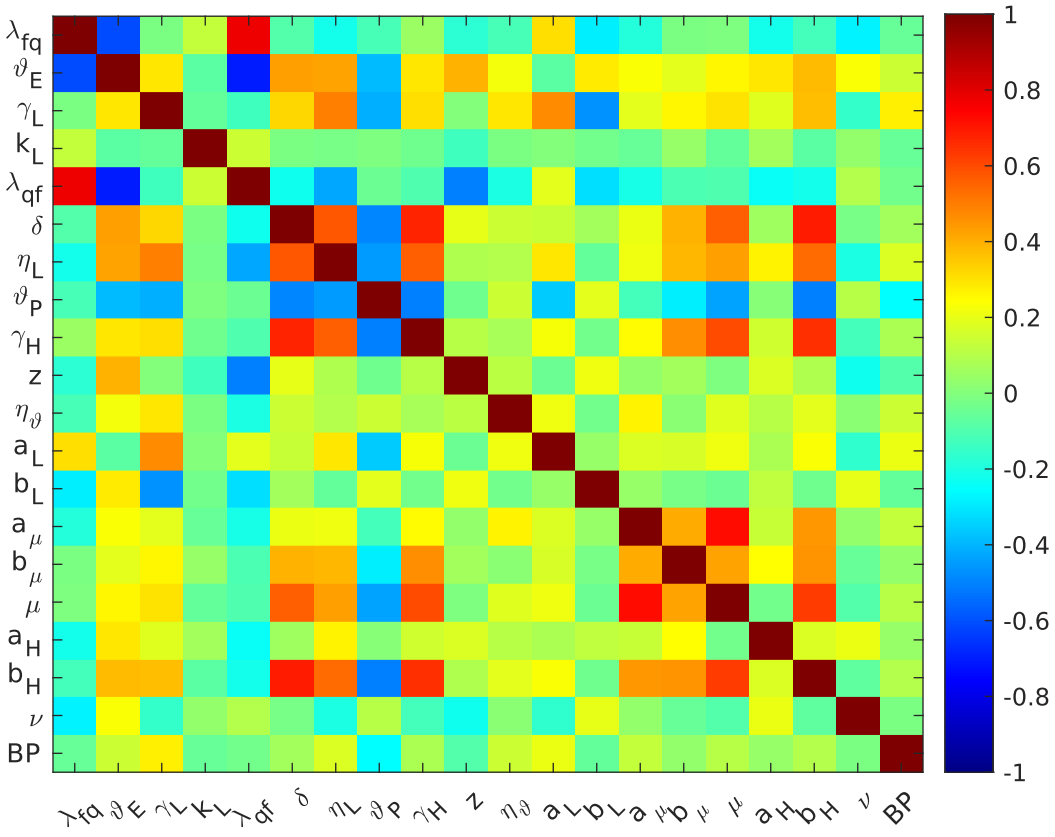
5.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.1172'	'0.1488'	'0.133'	'0.0708'	'0.1122'
\vartheta_E	'0.4793'	'0.5059'	'0.4926'	'0.2493'	'0.1375'
\gamma_L	'0.5263'	'0.5657'	'0.546'	'0.4506'	'0.1072'
k_L	'5.4411'	'5.5564'	'5.4988'	'5.3777'	'0.0444'
\lambda_{qf}	'0.1753'	'0.2066'	'0.1909'	'0.1179'	'0.1375'
\delta	'0.1132'	'0.1202'	'0.1167'	'0.1498'	'0.1655'
\eta_L	'0.6339'	'0.6796'	'0.6568'	'0.9888'	'0.1596'
\vartheta_P	'0.0061'	'0.0094'	'0.0077'	'0.1181'	'0.112'
\gamma_H	'0.6916'	'0.7316'	'0.7116'	'0.9795'	'0.1737'
z	'11.6166'	'12.7305'	'12.1736'	'29.5767'	'0.0896'
\eta_\vartheta	'0.8094'	'0.8363'	'0.8229'	'0.9919'	'0.0711'
a_L	'3.3864'	'3.5551'	'3.4708'	'2.8815'	'0.0764'
b_L	'9.8958'	'10.5296'	'10.2127'	'14.9532'	'0.0791'
a_\mu	'8.1002'	'8.4673'	'8.2837'	'1.0653'	'0.1016'
b_\mu	'8.2093'	'8.6305'	'8.4199'	'12.9082'	'0.0904'
\mu	'0.5616'	'0.6009'	'0.5812'	'0.0382'	'0.1596'
a_H	'6.9912'	'7.3267'	'7.159'	'14.845'	'0.072'
b_H	'9.8602'	'10.4139'	'10.137'	'5.4212'	'0.182'
\nu	'217.2371'	'239.4285'	'228.3328'	'492.6919'	'0.0761'
BP	'230.4351'	'230.5649'	'230.5'	'229.4983'	'0.0515'

5.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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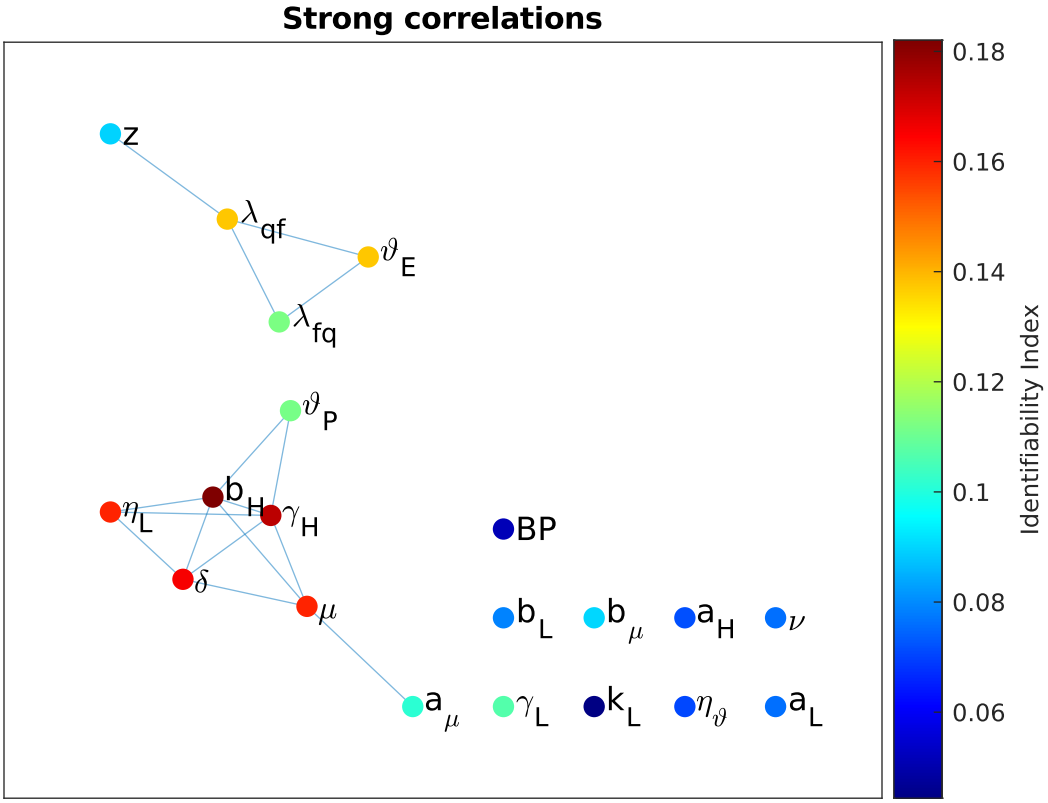
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
z
λ_{qf}
ϑ_E
λ_{fq}
ϑ_P
b_H
η_L
γ_H
δ
μ
a_μ
BP
b_L
b_μ
a_H
ν
γ_L
k_L
η_ϑ
a_L
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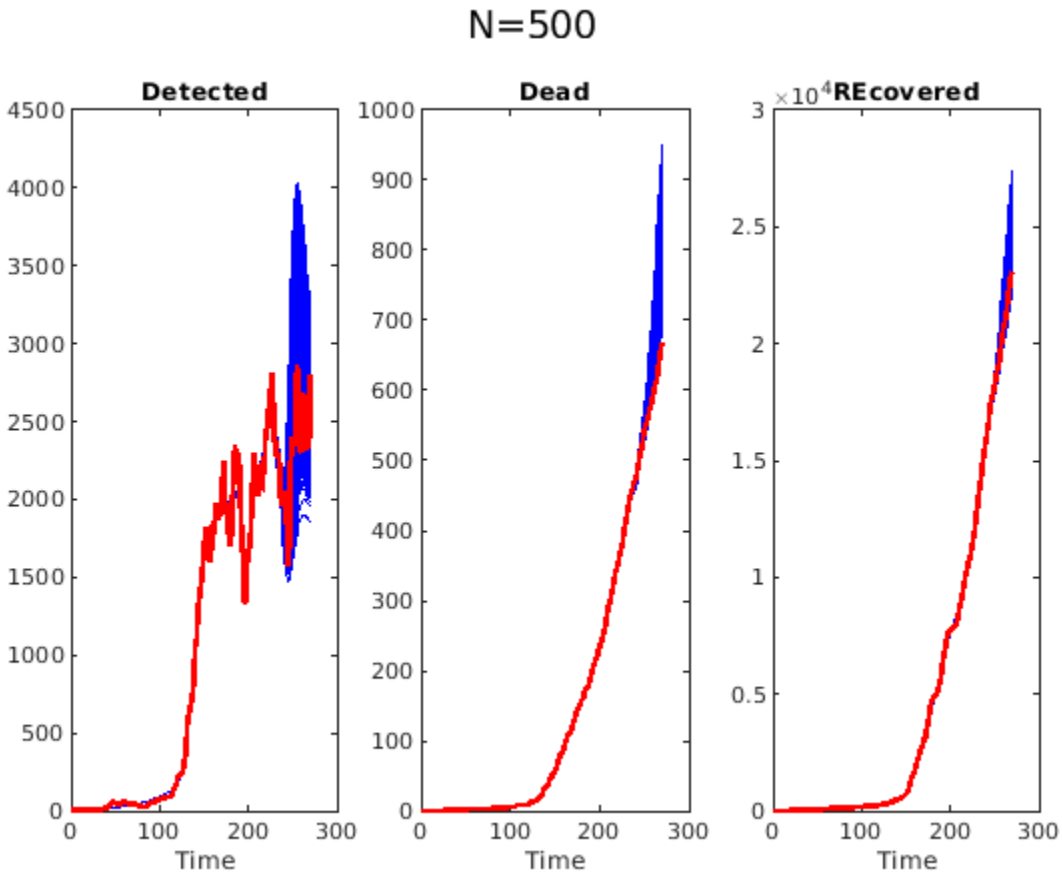
0.16
0.14
0.12
0.1
0.08
0.06
Identifiability Index

5.4. Uncertainty analisys



Chapter 6. Extension number6

6.1. Basic information

The extension to be validated consists of the time series from the data271 to the 296. The status of the validation is: COMPLETED.

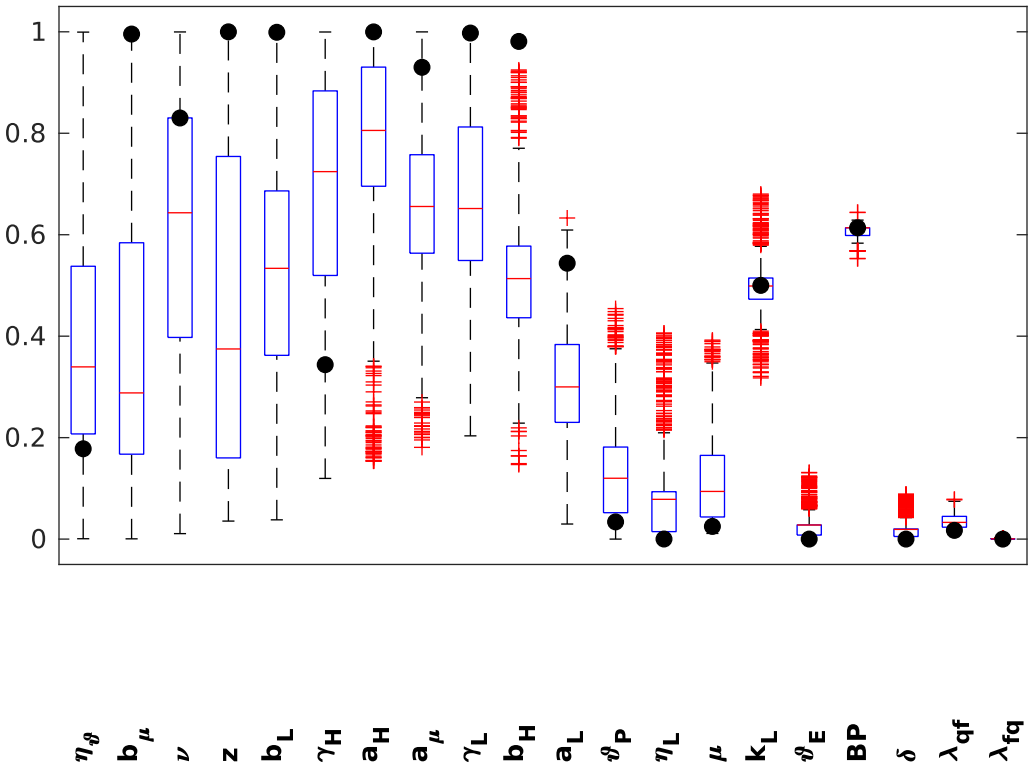
The number of estimations needed to perform the validation was1000.

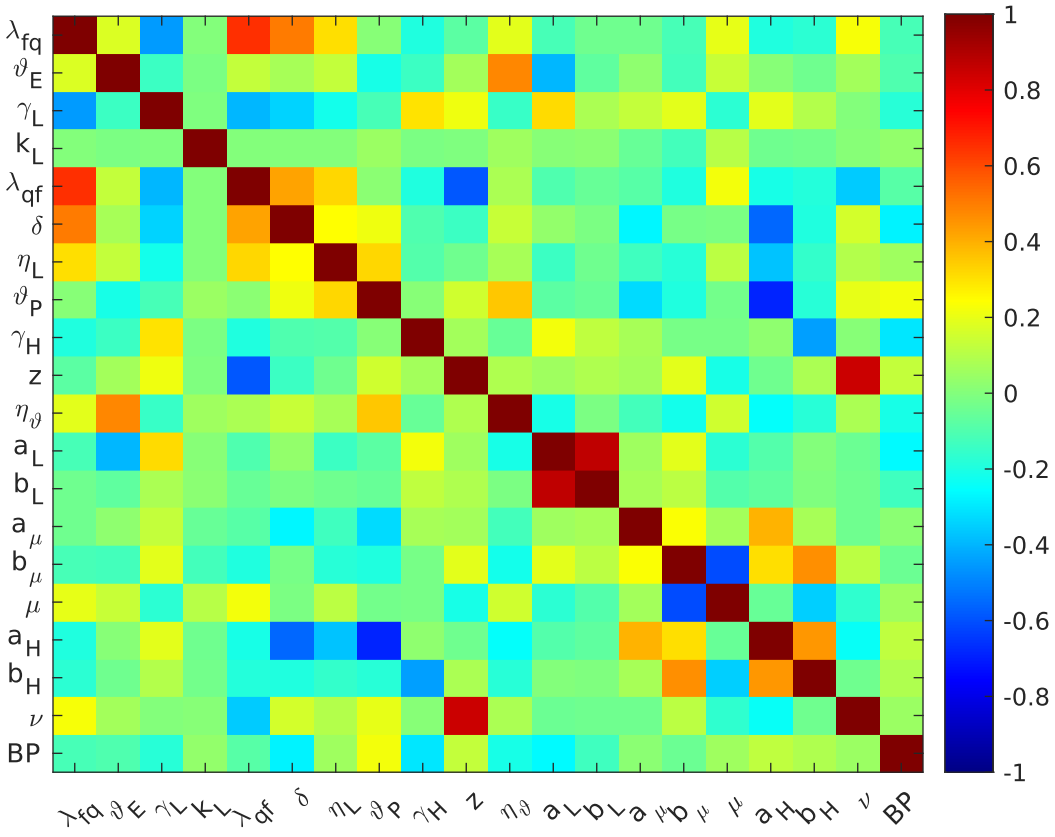
6.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0009'	'0.0004'	'0'	'0.0973'
\vartheta_E	'0.005'	'0.0506'	'0.0278'	'0.0001'	'0.079'
\gamma_L	'0.6333'	'0.6699'	'0.6516'	'0.9975'	'0.0891'
k_L	'5.3726'	'5.6075'	'5.4901'	'5.5012'	'0.0452'
\lambda_{qf}	'0.0312'	'0.0348'	'0.033'	'0.0172'	'0.1055'
\delta	'0.0008'	'0.0049'	'0.0029'	'0'	'0.1102'
\eta_L	'0.0552'	'0.1018'	'0.0785'	'0.0002'	'0.0861'
\vartheta_P	'0.1034'	'0.1368'	'0.1201'	'0.034'	'0.0968'
\gamma_H	'0.7022'	'0.7465'	'0.7244'	'0.3438'	'0.077'
z	'10.2816'	'12.2068'	'11.2442'	'29.9982'	'0.1211'
\eta_\vartheta	'0.3169'	'0.362'	'0.3395'	'0.178'	'0.086'
a_L	'5.0387'	'5.3622'	'5.2005'	'8.6136'	'0.0909'
b_L	'8.1279'	'8.8166'	'8.4722'	'14.9866'	'0.0868'
a_\mu	'9.8887'	'10.4674'	'10.1781'	'14.0201'	'0.074'
b_\mu	'4.6595'	'5.4095'	'5.0345'	'14.9377'	'0.1096'
\mu	'0.0762'	'0.1123'	'0.0942'	'0.025'	'0.092'
a_H	'11.8661'	'12.6891'	'12.2776'	'14.9972'	'0.1328'
b_H	'7.9305'	'8.448'	'8.1892'	'14.7342'	'0.0835'
\nu	'309.3882'	'333.8786'	'321.6334'	'415.0438'	'0.0966'
BP	'270.4166'	'270.5834'	'270.5'	'270.4999'	'0.0572'

6.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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0.2
0
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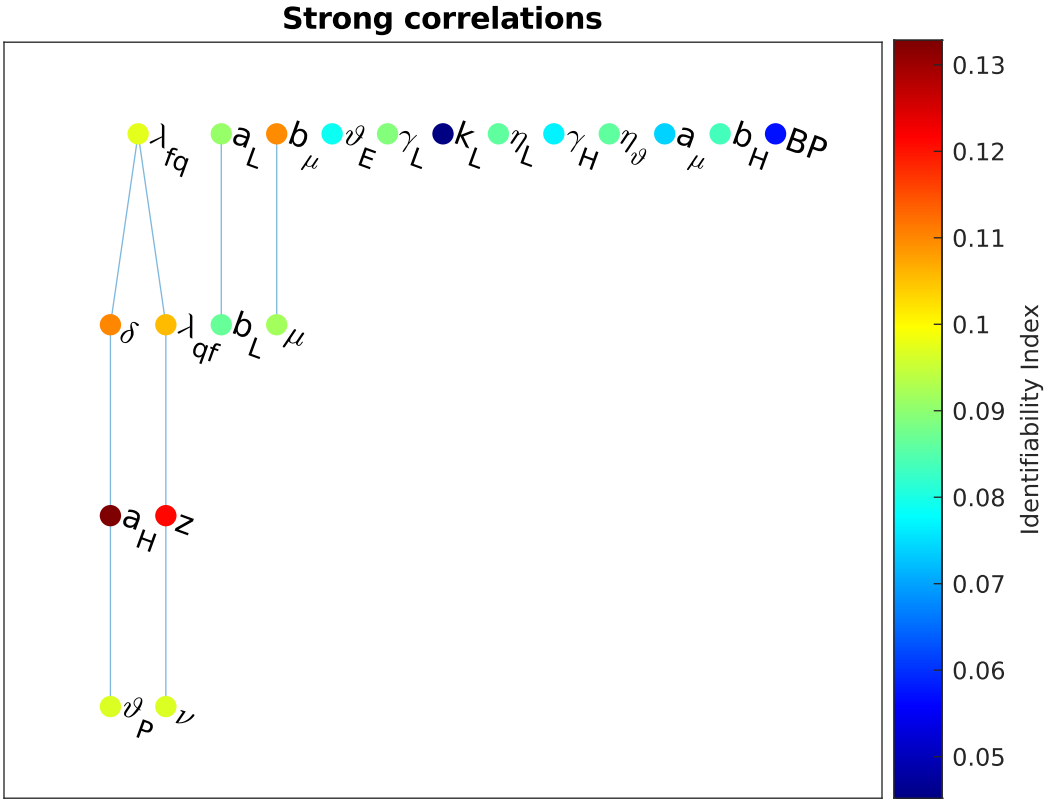
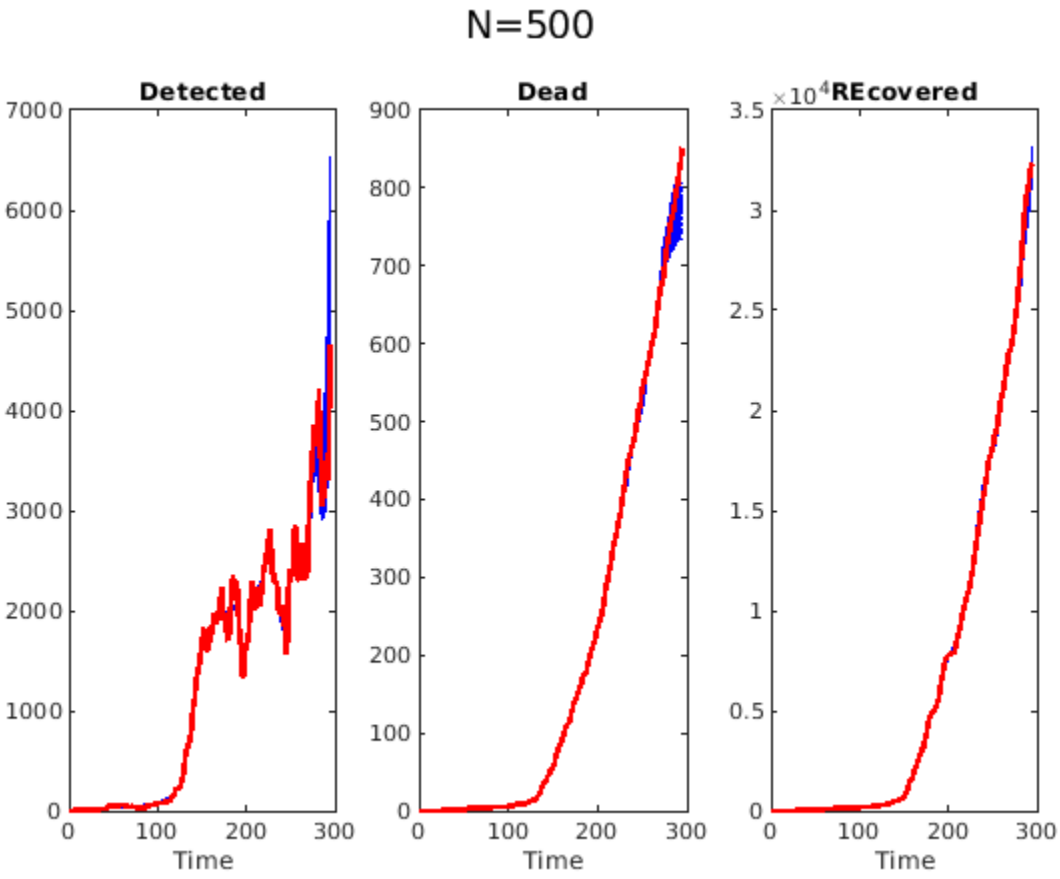
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
a_L
b_μ
ϑ_E
γ_L
k_L
η_L
γ_H
η_ϑ
a_μ
b_H
BP
δ
λ_{qf}
b_L
μ
a_H
z
ϑ_P
ν
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
Identifiability Index

6.4. Uncertainty analisys



Chapter 7. Extension number7

7.1. Basic information

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

The number of estimations needed to perform the validation was1000.

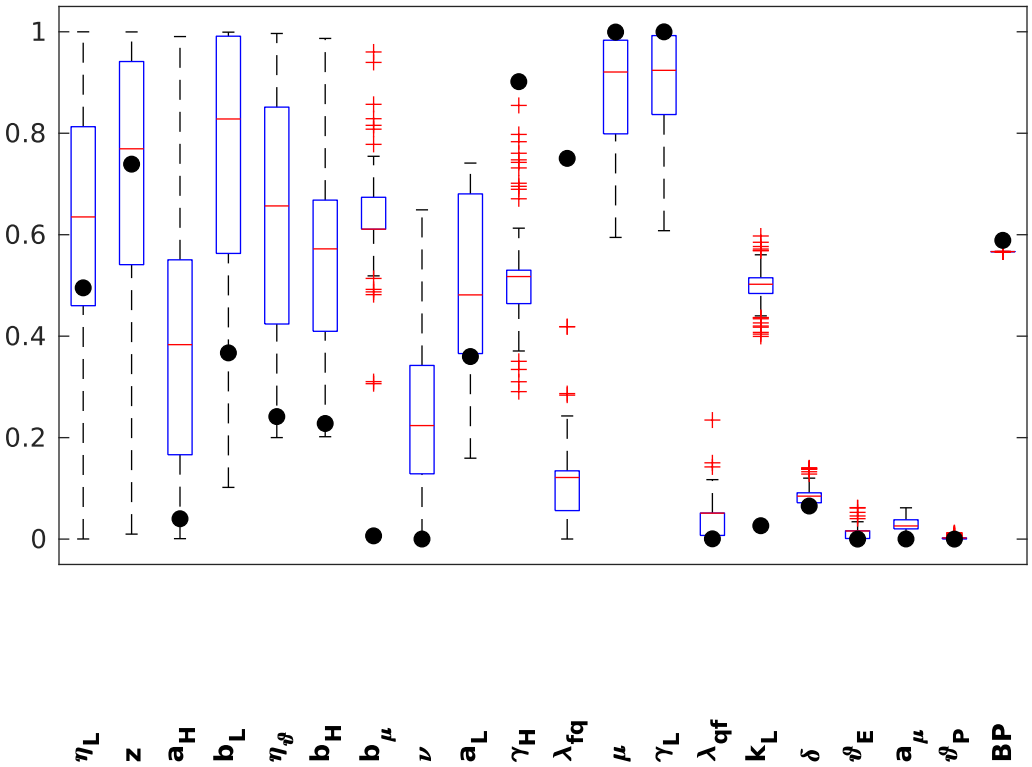
7.2. Estimated parameters with their intervals

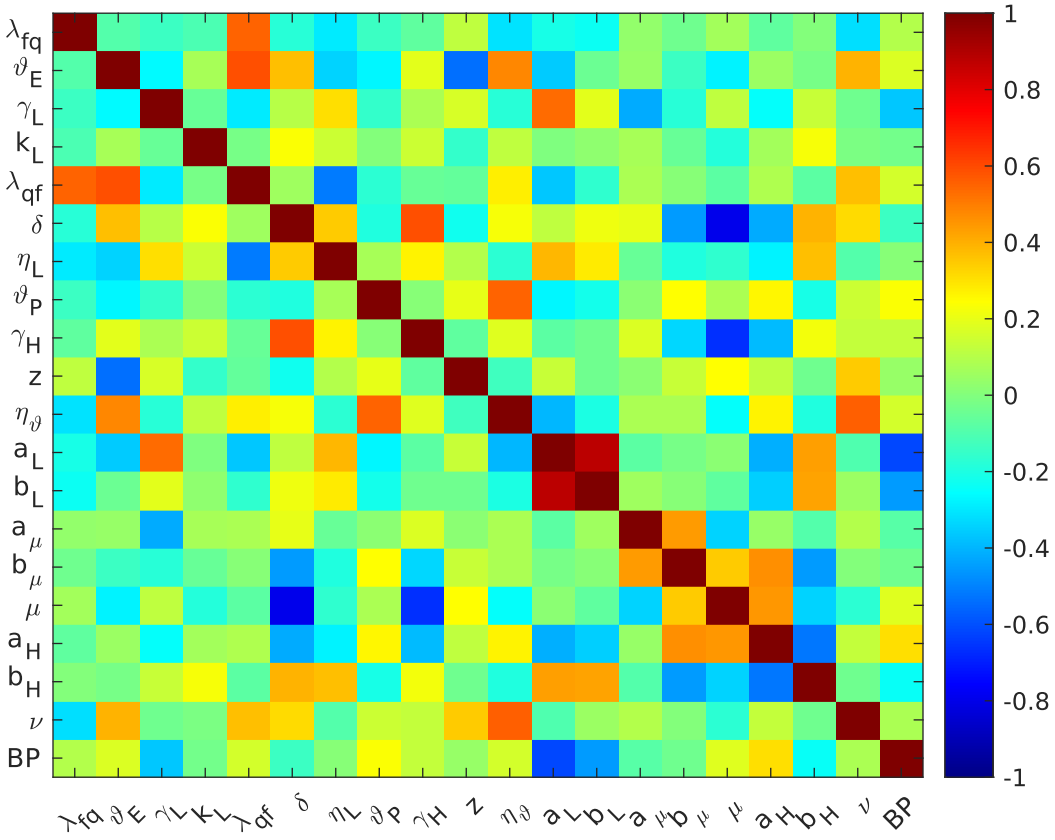
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4763'	'1'	'0.1217'	'0.7505'	'0.1484'
\vartheta_E	'0'	'0'	'0.0163'	'0'	'0.1347'
\gamma_L	'0.5043'	'1'	'0.924'	'0.9999'	'0.1304'
k_L	'1'	'10'	'5.521'	'1.2375'	'0.0747'
\lambda_{qf}	'0'	'0.0012'	'0.0514'	'0.0005'	'0.1796'
\delta	'0.0005'	'0.022'	'0.0127'	'0.0098'	'0.1768'
\eta_L	'0'	'1'	'0.635'	'0.4953'	'0.1626'
\vartheta_P	'0'	'0'	'0.0024'	'0'	'0.0834'
\gamma_H	'0.0192'	'0.96'	'0.5175'	'0.9017'	'0.15'
z	'10.4974'	'24.9747'	'23.0798'	'22.1723'	'0.1464'
\eta_\vartheta	'0.2395'	'0.286'	'0.6567'	'0.2415'	'0.1658'
a_L	'5.7749'	'7.122'	'7.7391'	'6.0375'	'0.1728'
b_L	'6.1074'	'9.3017'	'12.5937'	'6.1388'	'0.1492'
a_\mu	'1'	'13.6'	'1.3667'	'1.0034'	'0.0604'
b_\mu	'1'	'13.6'	'9.5525'	'1.0896'	'0.142'
\mu	'0.1'	'1'	'0.9203'	'0.9995'	'0.1549'
a_H	'1'	'15'	'6.366'	'1.5617'	'0.1608'
b_H	'1.28'	'15'	'9.0091'	'4.1904'	'0.1372'
\nu	'0.0037'	'0.1474'	'112.9553'	'0.0711'	'0.1363'
BP	'295.9214'	'298.5183'	'296.5'	'297.5'	'0.0859'

7.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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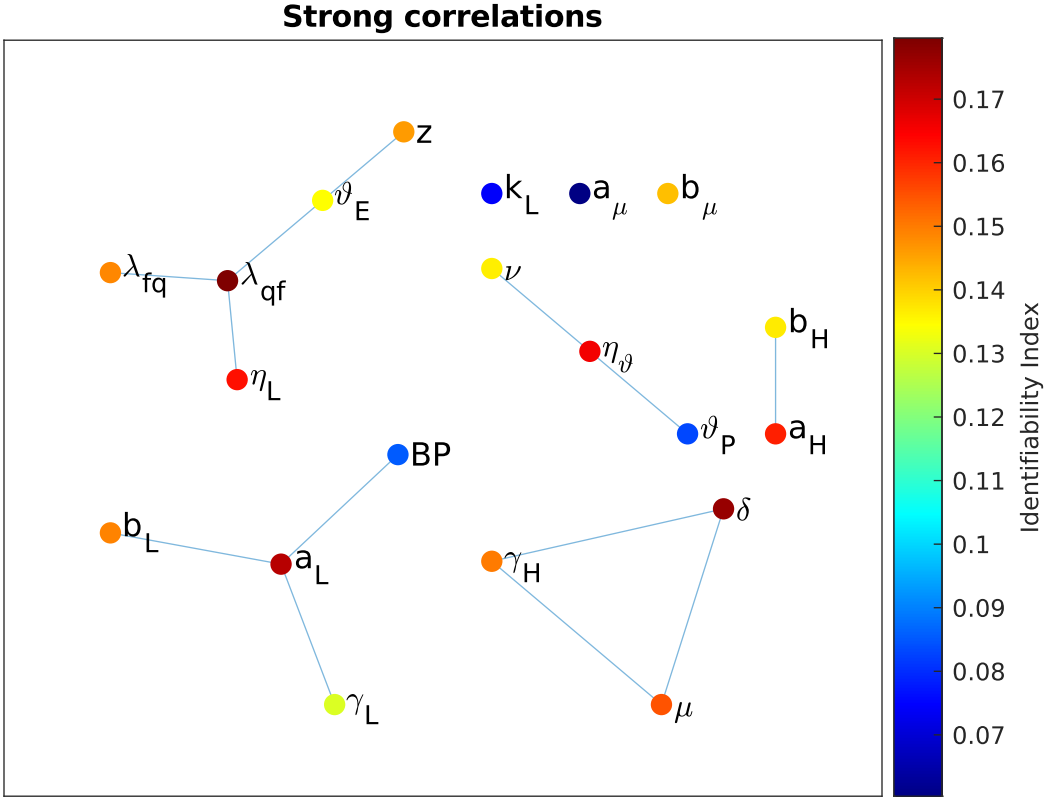
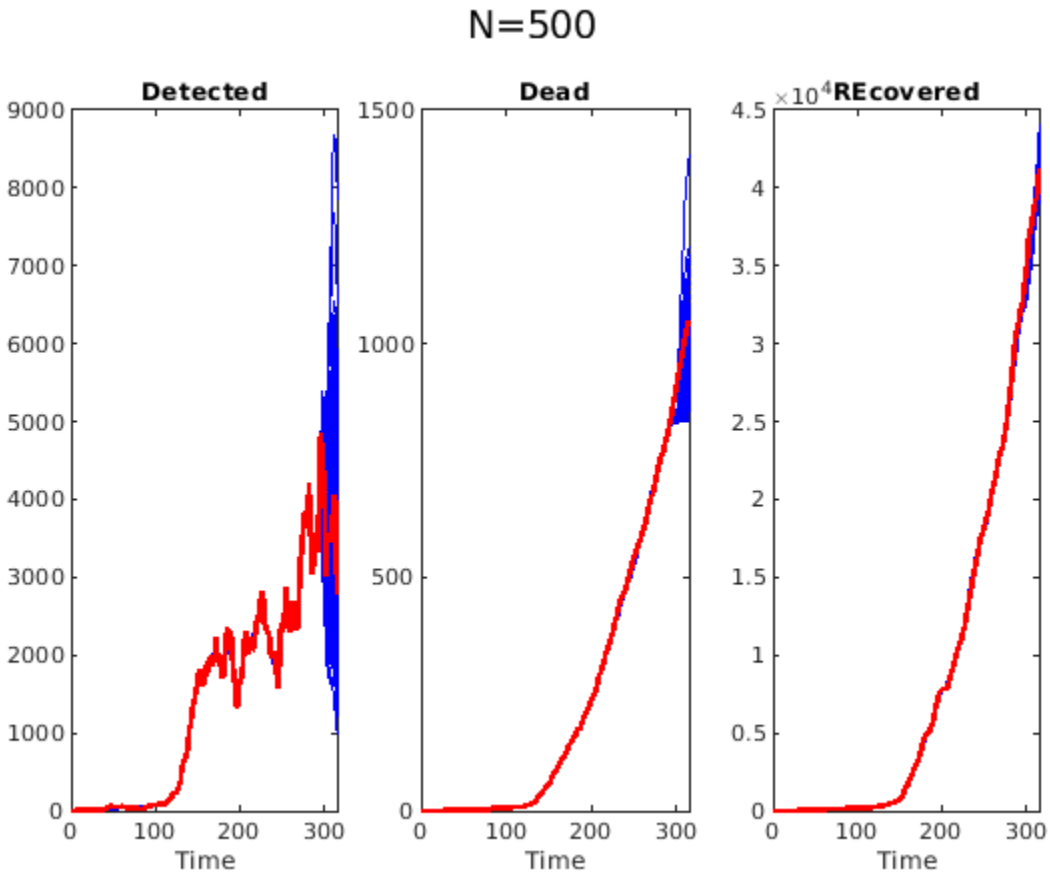
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
z
ϑ_E
k_L
a_μ
b_μ
λ_{fq}
λ_{qf}
ν
b_H
η_L
η_ϑ
ϑ_P
a_H
BP
b_L
a_L
δ
γ_H
γ_L
μ
Identifiability Index
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07

7.4. Uncertainty analisys



Chapter 8. Extension number8

8.1. Basic information

The extension to be validated consists of the time series from the data316 to the 333. The status of the validation is: COMPLETED.

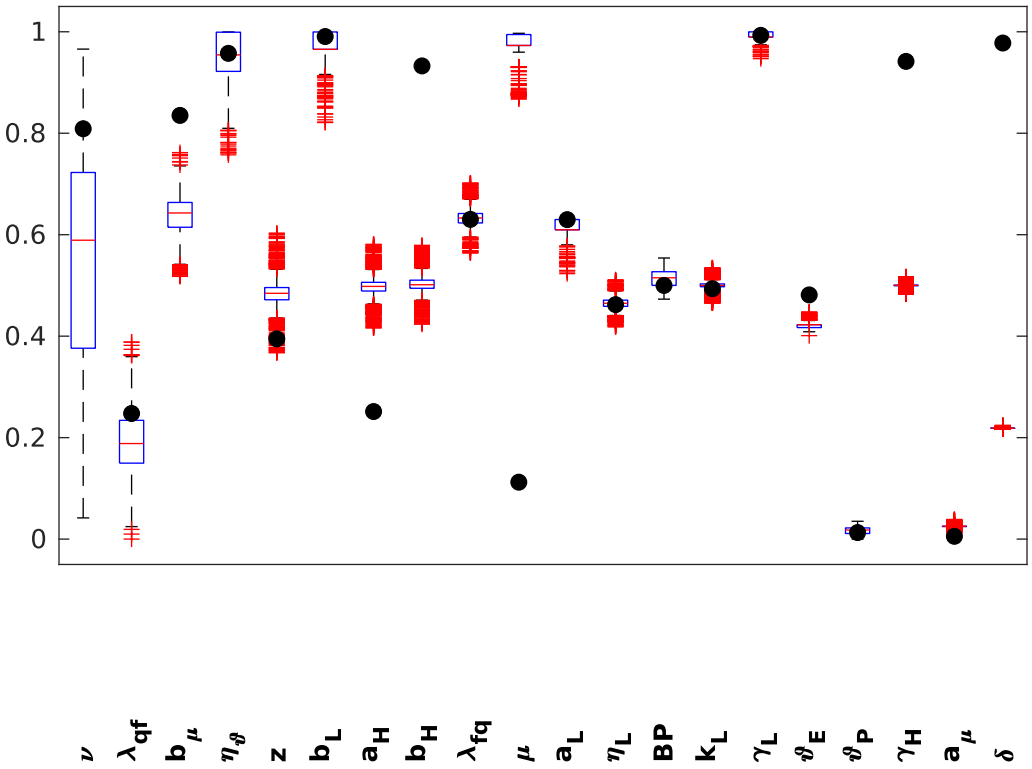
The number of estimations needed to perform the validation was1000.

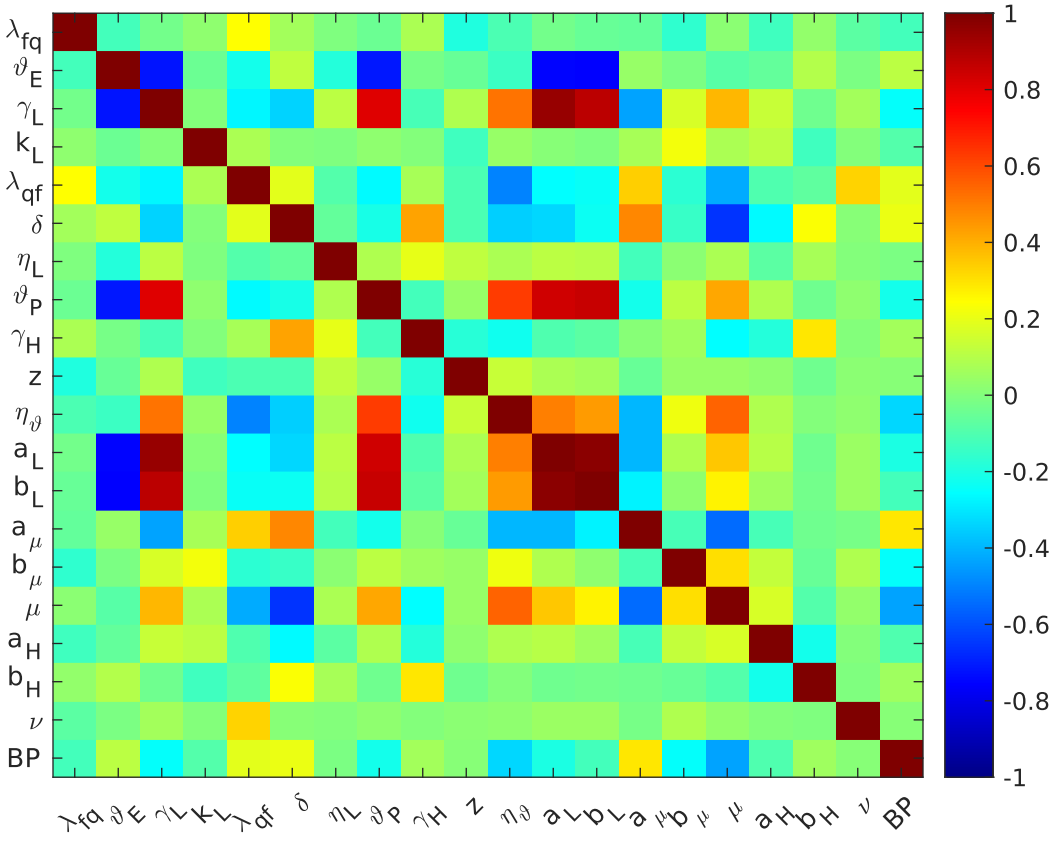
8.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.6268'	'0.639'	'0.6329'	'0.6302'	'0.051'
\vartheta_E	'0.4128'	'0.4323'	'0.4225'	'0.4814'	'0.1375'
\gamma_L	'0.9669'	'1'	'0.9895'	'0.9929'	'0.1829'
k_L	'5.4529'	'5.5468'	'5.4998'	'5.4414'	'0.0438'
\lambda_{qf}	'0.1785'	'0.1983'	'0.1884'	'0.2476'	'0.0866'
\delta	'0.0315'	'0.0341'	'0.0328'	'0.1467'	'0.1015'
\eta_L	'0.459'	'0.4707'	'0.4649'	'0.4621'	'0.0501'
\vartheta_P	'0.0173'	'0.0186'	'0.0179'	'0.0129'	'0.16'
\gamma_H	'0.4946'	'0.5058'	'0.5002'	'0.9416'	'0.0615'
z	'14.2671'	'14.8048'	'14.536'	'11.8398'	'0.0532'
\eta_\vartheta	'0.944'	'0.9644'	'0.9542'	'0.9574'	'0.1387'
a_L	'9.2959'	'9.7737'	'9.5348'	'9.8155'	'0.1689'
b_L	'14.1576'	'14.8709'	'14.5142'	'14.8681'	'0.1691'
a_\mu	'1.2838'	'1.4274'	'1.3556'	'1.0771'	'0.0928'
b_\mu	'9.8875'	'10.1118'	'9.9996'	'12.6918'	'0.0627'
\mu	'0.9572'	'0.9888'	'0.973'	'0.1122'	'0.1431'
a_H	'7.865'	'8.081'	'7.973'	'4.5198'	'0.0596'
b_H	'7.918'	'8.1197'	'8.0189'	'14.0576'	'0.0517'
\nu	'284.8935'	'304.2341'	'294.5638'	'404.4154'	'0.0549'
BP	'315.0174'	'315.0975'	'315.0575'	'314.5'	'0.0644'

8.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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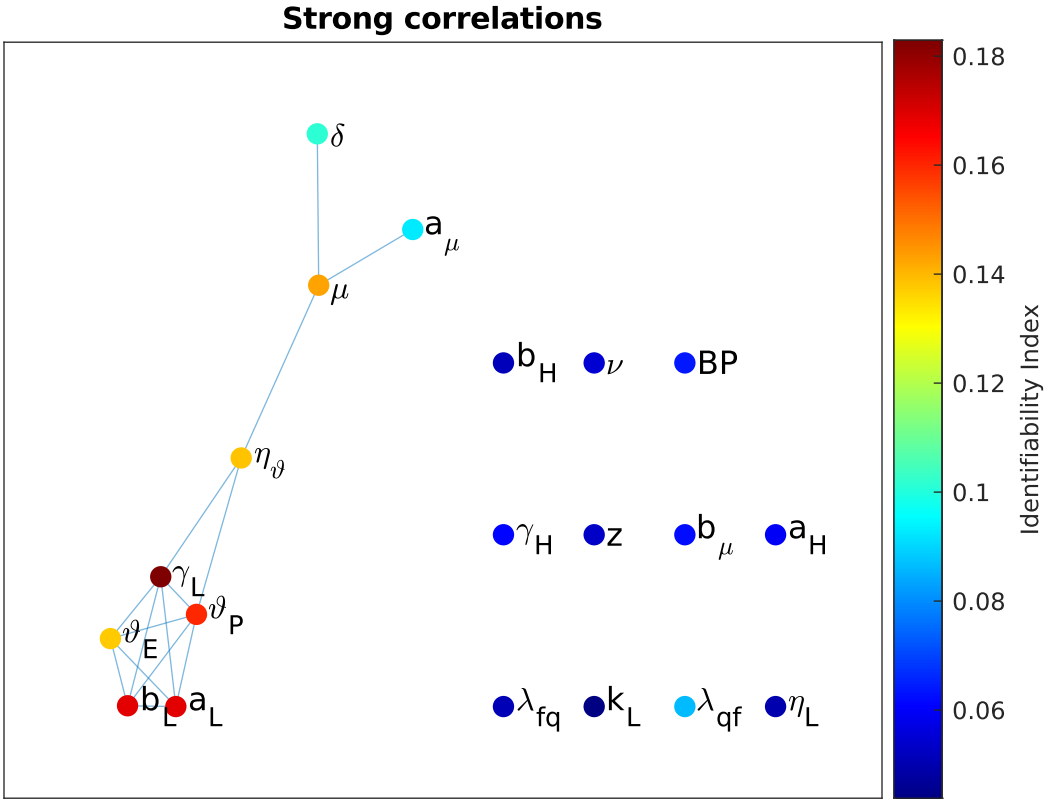
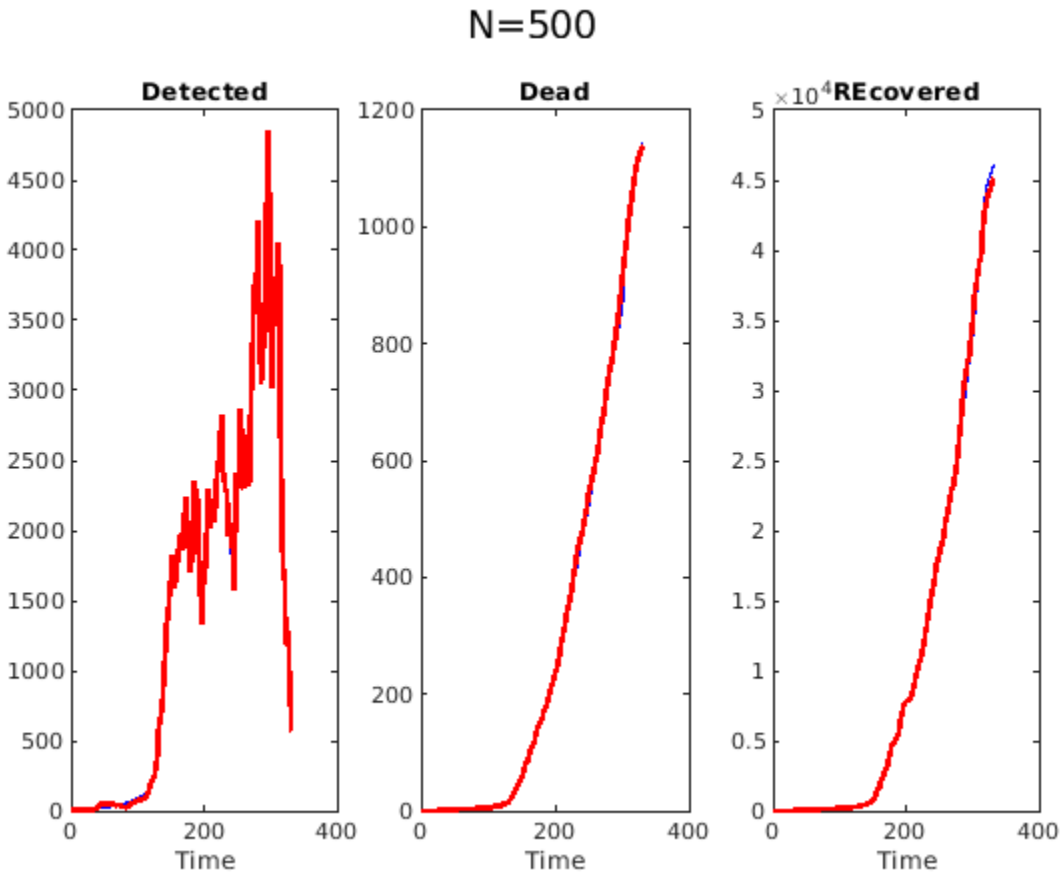
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
δ
a μ
μ
η ϑ
γ L
ϑ P
ϑ E
b L
a L
b H
ν
BP
γ H
z
b μ
a H
λ fq
k L
λ qf
η L
0.18
0.16
0.14
0.12
0.1
0.08
0.06
Identifiability Index

8.4. Uncertainty analisys



Chapter 9. Extension number9

9.1. Basic information

The extension to be validated consists of the time series from the data333 to the 433. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

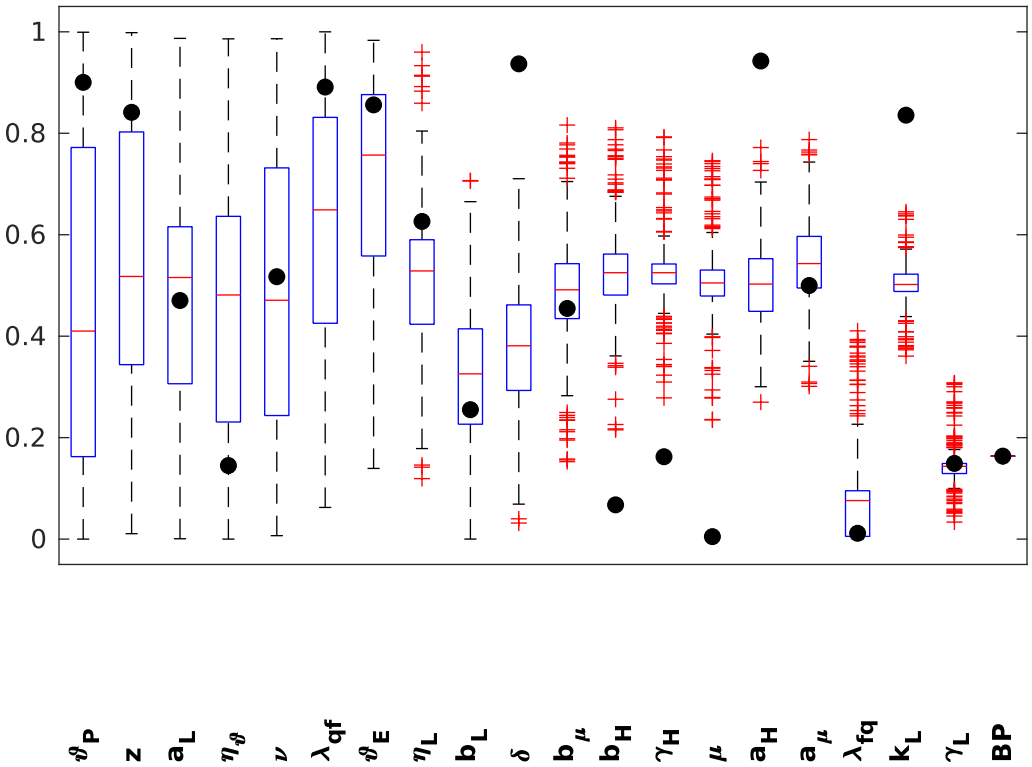
9.2. Estimated parameters with their intervals

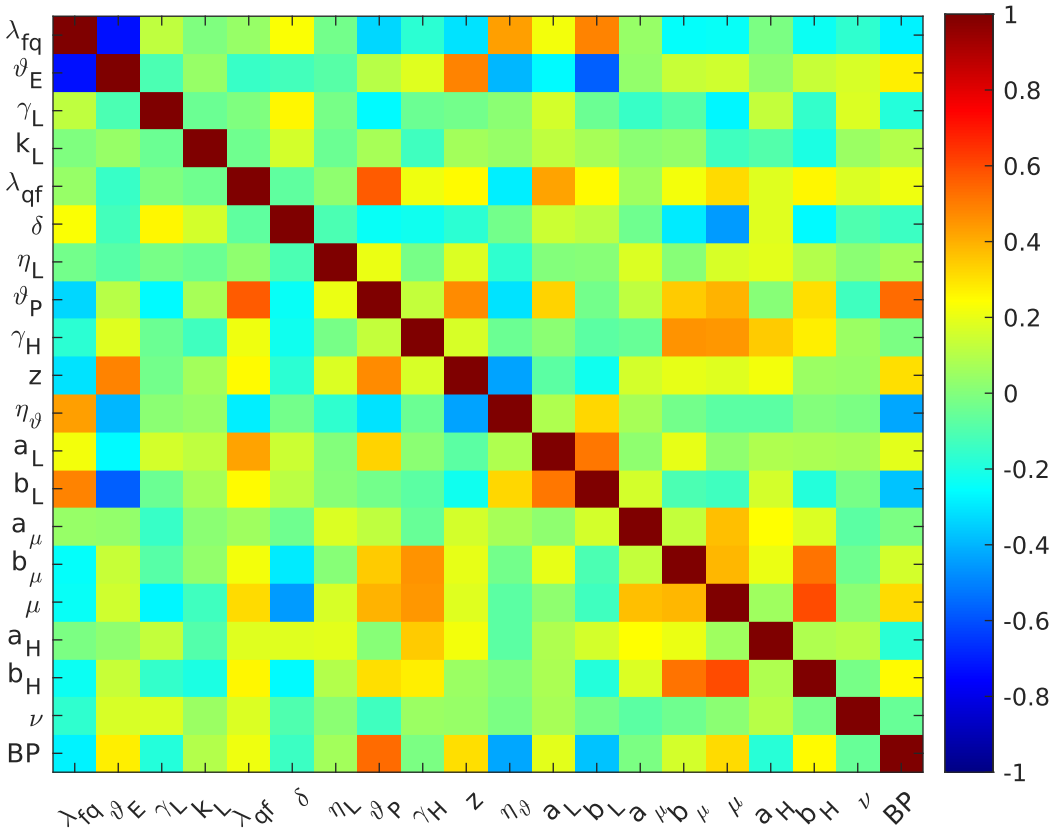
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

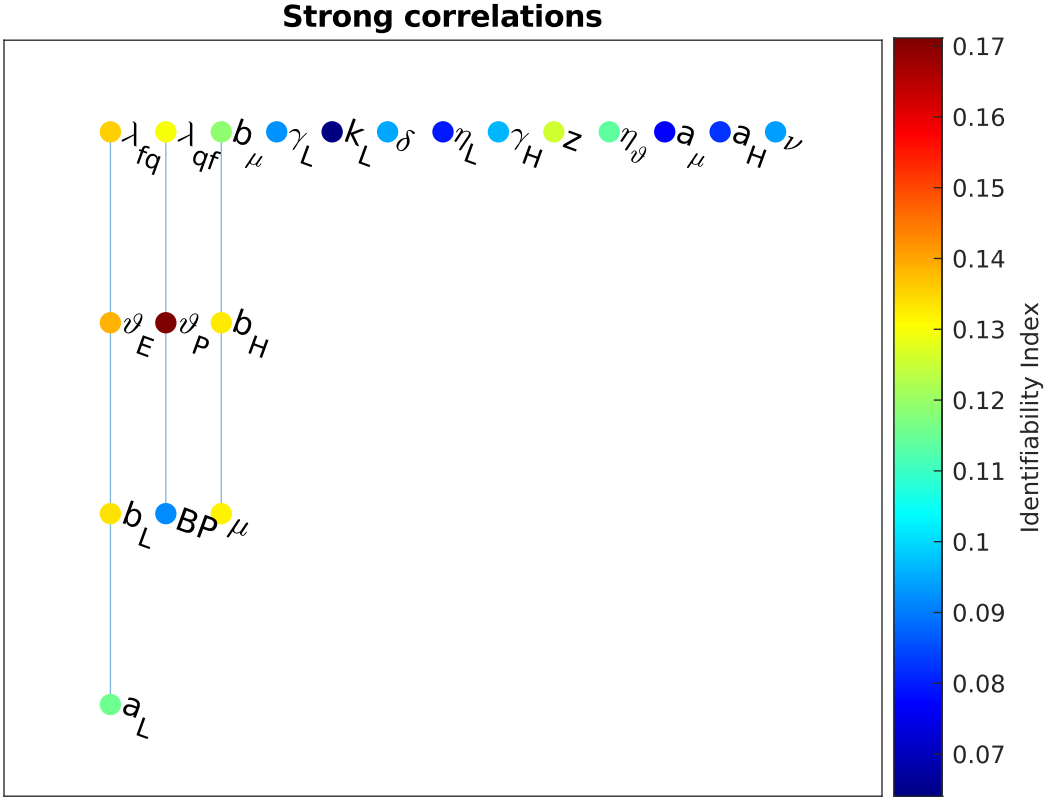
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0005'	'0.0225'	'0.0759'	'0.0115'	'0.136'
\vartheta_E	'0.8525'	'0.8647'	'0.757'	'0.856'	'0.1387'
\gamma_L	'0.0931'	'0.1524'	'0.1434'	'0.1492'	'0.0926'
k_L	'1'	'10'	'5.5176'	'8.5212'	'0.0641'
\lambda_{qf}	'0.6988'	'0.9853'	'0.649'	'0.8911'	'0.13'
\delta	'0'	'0.15'	'0.0572'	'0.1405'	'0.0948'
\eta_L	'0.02'	'1'	'0.5286'	'0.6262'	'0.0799'
\vartheta_P	'0.8749'	'0.9281'	'0.4101'	'0.9004'	'0.1711'
\gamma_H	'0'	'0.3368'	'0.5251'	'0.1624'	'0.0966'
z	'24.0463'	'26.6247'	'15.5327'	'25.2389'	'0.1257'
\eta_\vartheta	'0.0235'	'0.3138'	'0.4812'	'0.145'	'0.1142'
a_L	'4.9236'	'7.6676'	'8.2191'	'7.5845'	'0.1157'
b_L	'2.4'	'8.6099'	'5.5606'	'4.5719'	'0.1337'
a_\mu	'1.623'	'15'	'8.6037'	'7.999'	'0.0768'
b_\mu	'1'	'14.44'	'7.88'	'7.3657'	'0.119'
\mu	'0'	'0.0109'	'0.505'	'0.0049'	'0.132'
a_H	'1'	'15'	'8.038'	'14.1943'	'0.0828'
b_H	'1'	'15'	'8.3516'	'1.9451'	'0.1327'
\nu	'126.7138'	'351.6786'	'235.4191'	'258.634'	'0.0938'
BP	'331.9036'	'333.5046'	'333.5'	'333.5'	'0.0918'

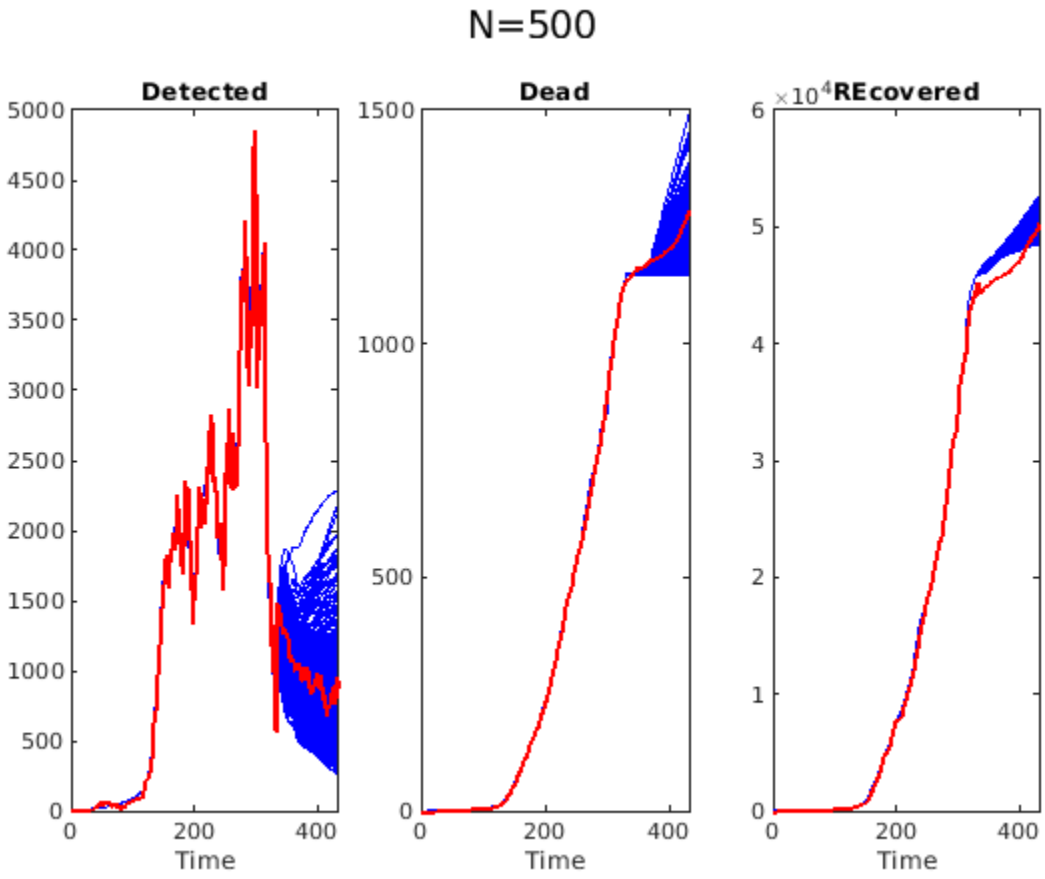
9.3. Identifiability analisys




λ_{fq}
ϑ_E
γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
BP
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
λ_{qf}
b_{μ}
γ_L
k_L
δ
η_L
γ_H
z
η_ϑ
a_{μ}
a_H
ν
ϑ_E
ϑ_P
b_H
b_L
BP
μ
a_L
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
Identifiability Index

9.4. Uncertainty analisys



Chapter 10. Extension number10

10.1. Basic information

The extension to be validated consists of the time series from the data433 to the 454. The status of the validation is: COMPLETED.

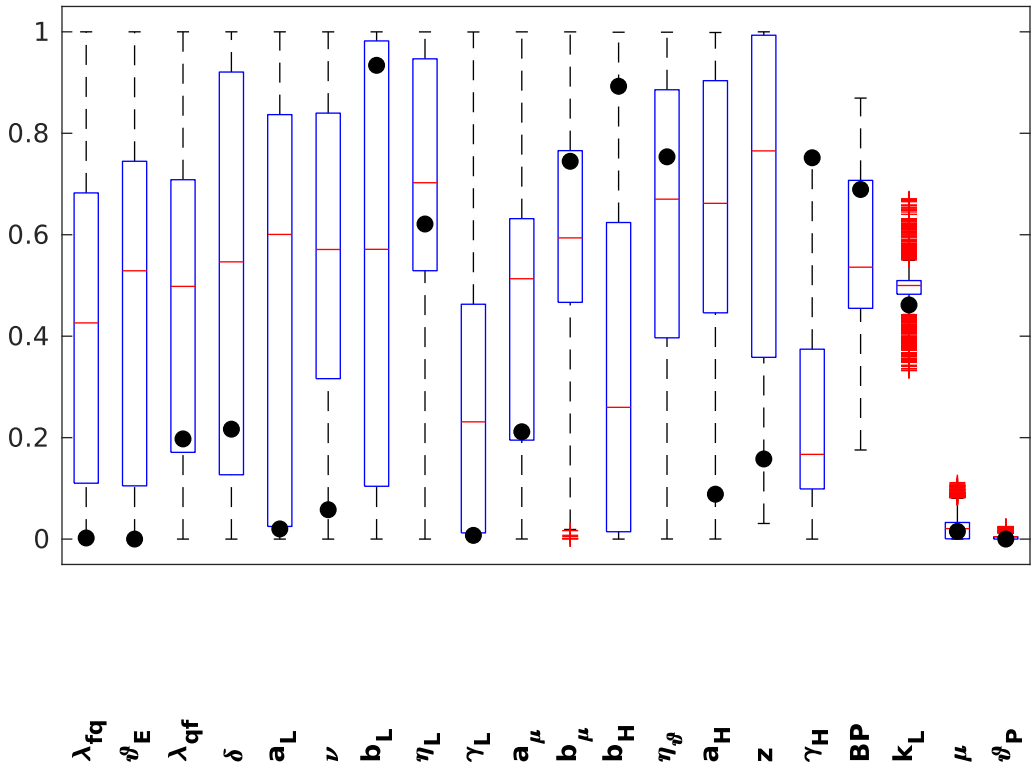
The number of estimations needed to perform the validation was1000.

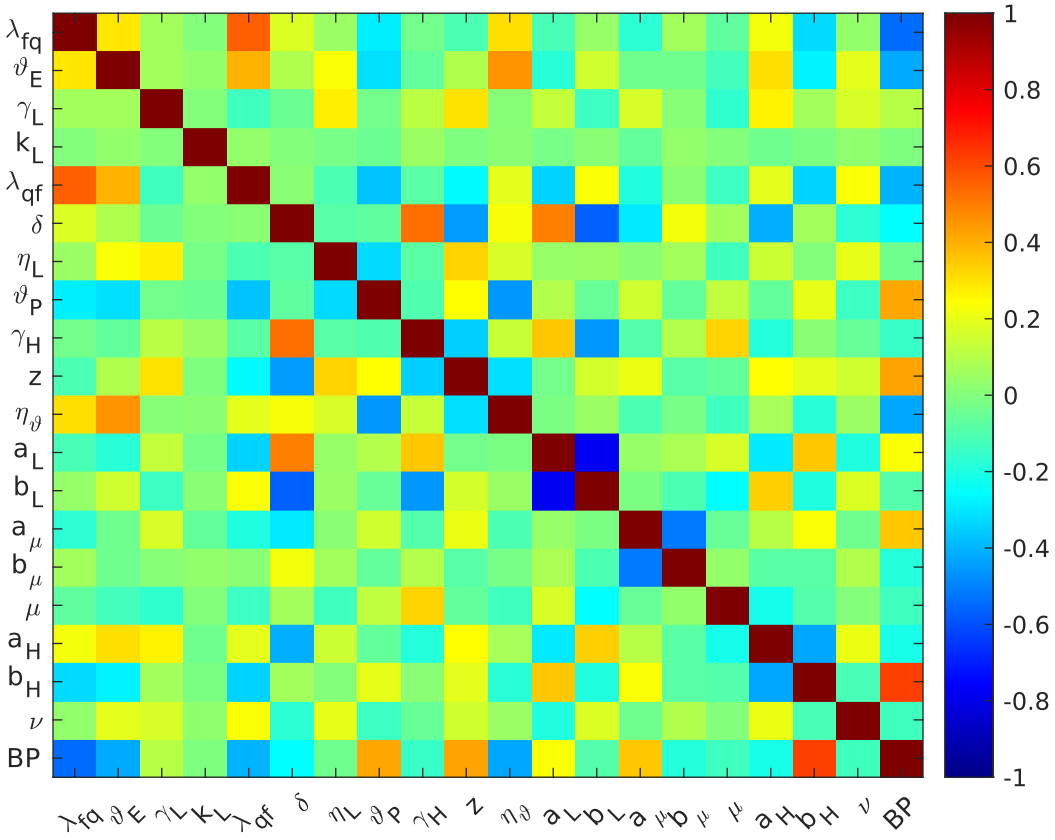
10.2. Estimated parameters with their intervals

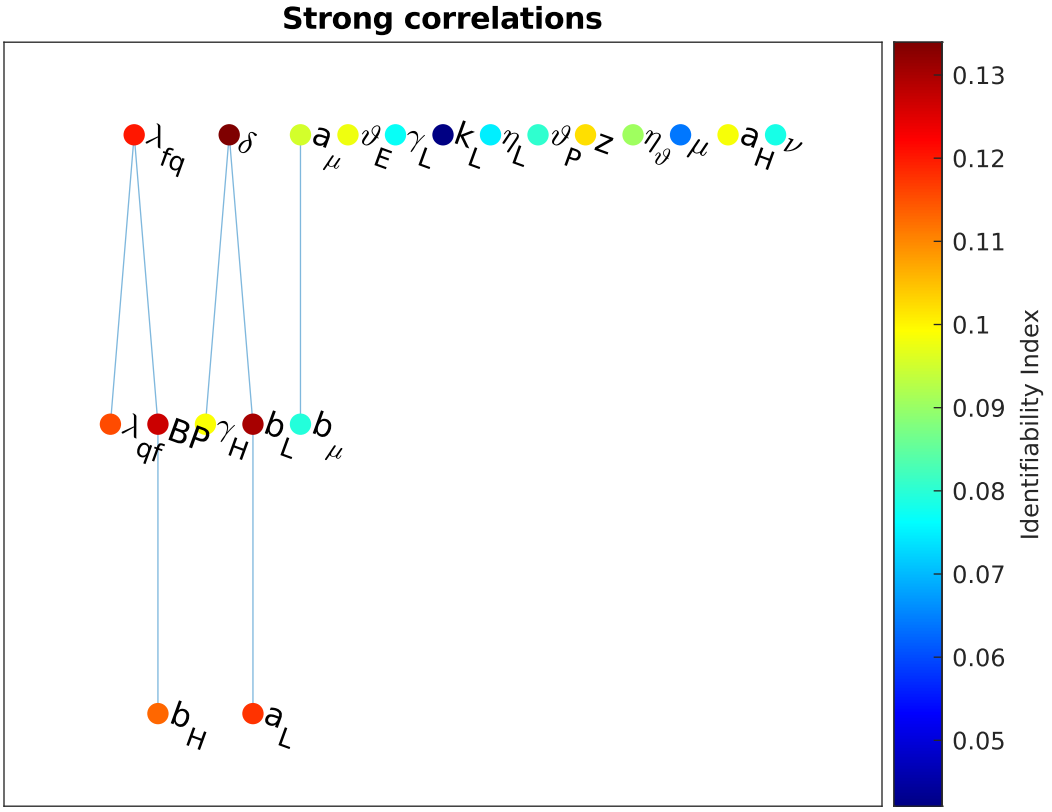
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3997'	'0.4527'	'0.4262'	'0.0022'	'0.12'
\vartheta_E	'0.503'	'0.5549'	'0.5289'	'0.0001'	'0.0978'
\gamma_L	'0.2071'	'0.2551'	'0.2311'	'0.0073'	'0.077'
k_L	'5.3941'	'5.6046'	'5.4993'	'5.1546'	'0.0421'
\lambda_{qf}	'0.4728'	'0.5236'	'0.4982'	'0.1975'	'0.1156'
\delta	'0.0773'	'0.0866'	'0.082'	'0.0325'	'0.1339'
\eta_L	'0.6822'	'0.7228'	'0.7025'	'0.6212'	'0.0751'
\vartheta_P	'0'	'0.0227'	'0.0046'	'0.0001'	'0.0805'
\gamma_H	'0.146'	'0.1881'	'0.167'	'0.7517'	'0.0988'
z	'22.1451'	'23.772'	'22.9586'	'4.7386'	'0.1023'
\eta_\vartheta	'0.6463'	'0.6939'	'0.6701'	'0.7536'	'0.0906'
a_L	'8.9796'	'9.8379'	'9.4088'	'1.2809'	'0.1178'
b_L	'8.5518'	'9.443'	'8.9974'	'14.0755'	'0.1301'
a_\mu	'7.8746'	'8.4972'	'8.1859'	'3.9624'	'0.0952'
b_\mu	'9.0508'	'9.5756'	'9.3132'	'11.4272'	'0.0797'
\mu	'0.0102'	'0.0312'	'0.0207'	'0.0152'	'0.0641'
a_H	'9.9442'	'10.589'	'10.2666'	'2.2394'	'0.0985'
b_H	'4.2383'	'5.0351'	'4.6367'	'13.498'	'0.1131'
\nu	'273.5014'	'297.4541'	'285.4778'	'28.9635'	'0.0785'
BP	'391.0952'	'393.9048'	'392.5'	'409.5'	'0.1268'

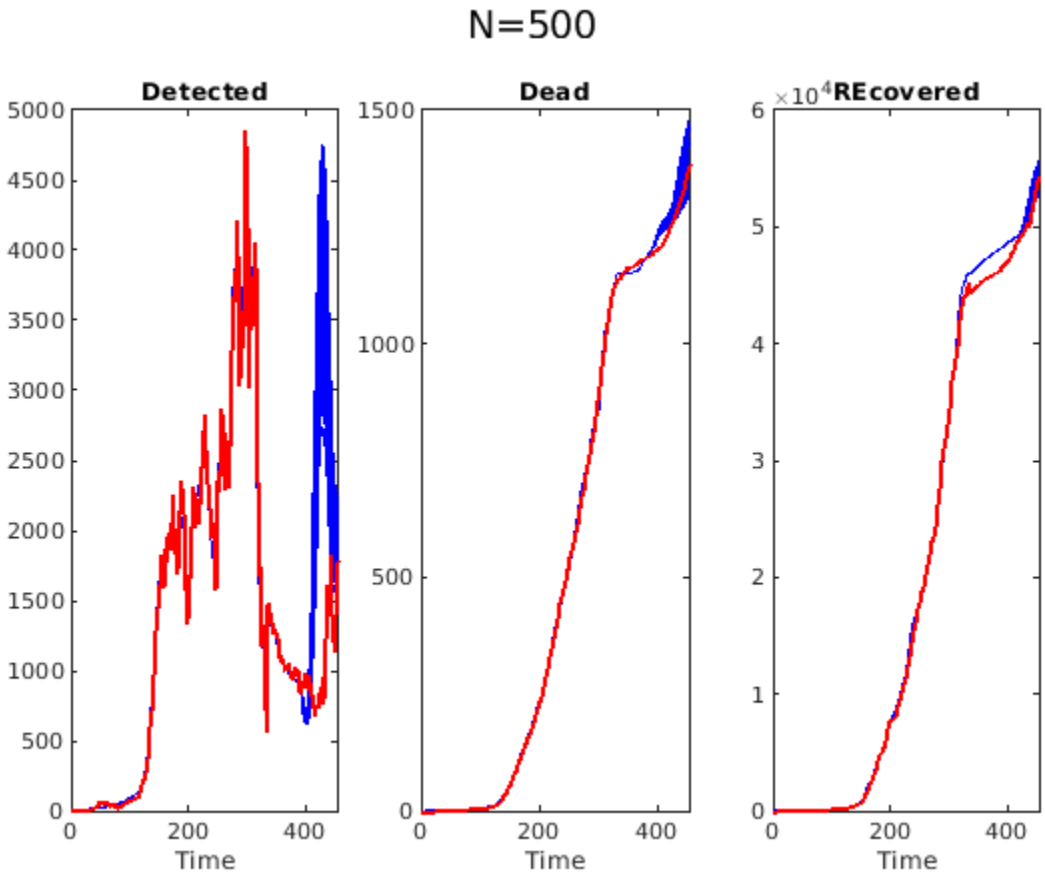
10.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05

10.4. Uncertainty analisys



Chapter 11. Extension number11

11.1. Basic information

The extension to be validated consists of the time series from the data454 to the 475. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

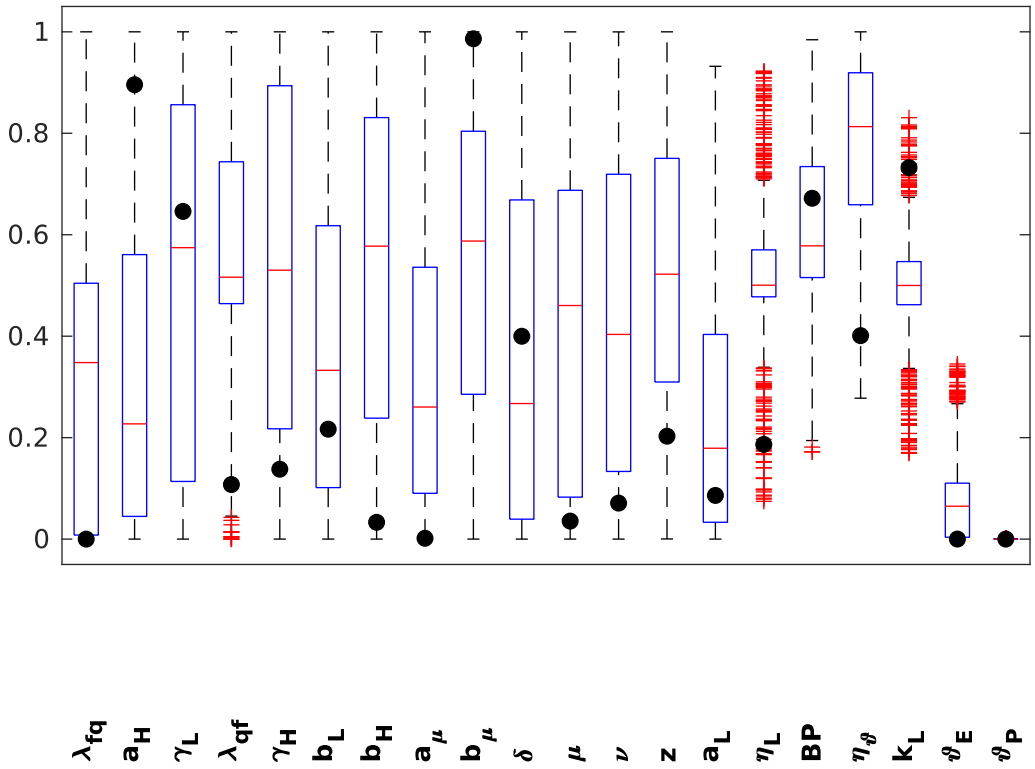
11.2. Estimated parameters with their intervals

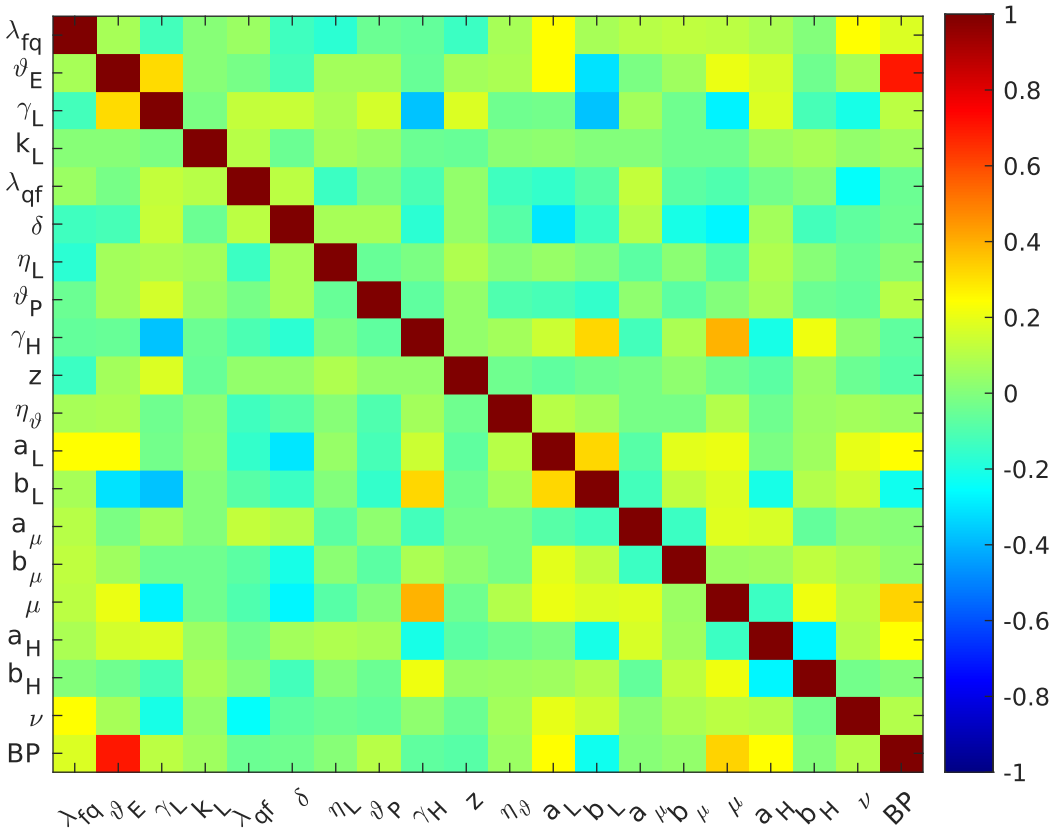
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

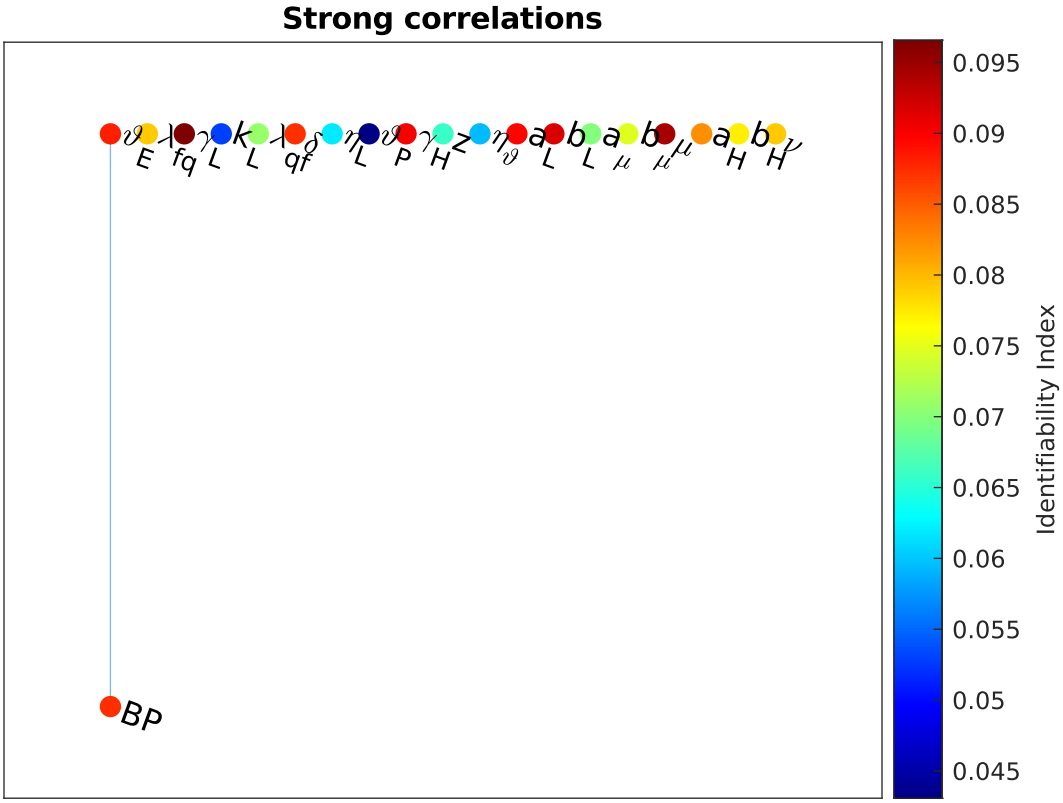
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0'	'0.348'	'0'	'0.0791'
\vartheta_E	'0'	'0.0002'	'0.0649'	'0.0001'	'0.088'
\gamma_L	'0.5753'	'0.9826'	'0.5745'	'0.646'	'0.0966'
k_L	'1'	'10'	'5.4999'	'7.5896'	'0.0529'
\lambda_{qf}	'0'	'0.2298'	'0.5163'	'0.1075'	'0.0709'
\delta	'0.0343'	'0.0601'	'0.0401'	'0.06'	'0.0873'
\eta_L	'0.128'	'1'	'0.5005'	'0.1867'	'0.062'
\vartheta_P	'0'	'0.0002'	'0.0001'	'0'	'0.0431'
\gamma_H	'0'	'0.3101'	'0.5301'	'0.1378'	'0.0902'
z	'5.5785'	'16.4958'	'15.6665'	'6.0861'	'0.0659'
\eta_\vartheta	'0.393'	'0.4929'	'0.8131'	'0.4011'	'0.0594'
a_L	'1.929'	'3.5535'	'3.5098'	'2.2056'	'0.0895'
b_L	'3.2402'	'4.7059'	'5.6586'	'4.0336'	'0.0917'
a_\mu	'1'	'11.206'	'4.645'	'1.0224'	'0.0699'
b_\mu	'1'	'15'	'9.2261'	'14.8081'	'0.0748'
\mu	'0.0032'	'0.0679'	'0.4605'	'0.0355'	'0.0944'
a_H	'3.3143'	'13.6'	'4.1803'	'13.5409'	'0.0823'
b_H	'1'	'15'	'9.0847'	'1.4634'	'0.0772'
\nu	'35.3048'	'49.8229'	'201.7468'	'35.4822'	'0.079'
BP	'450.6129'	'454.9838'	'451.5'	'454.5'	'0.0874'

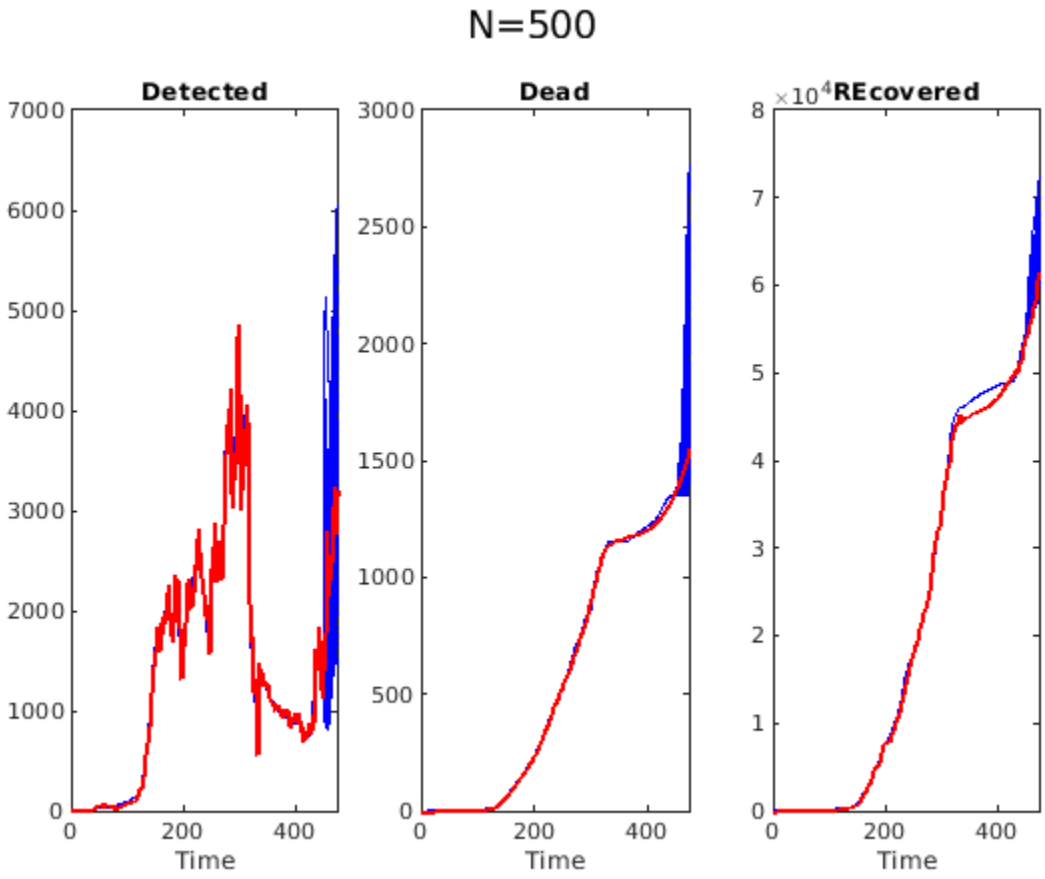
11.3. Identifiability analisys




λ_{fq}
ϑ_E
γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
BP
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
BP
Identifiability Index
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045

11.4. Uncertainty analisys



Chapter 12. Extension number12

12.1. Basic information

The extension to be validated consists of the time series from the data475 to the 482. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

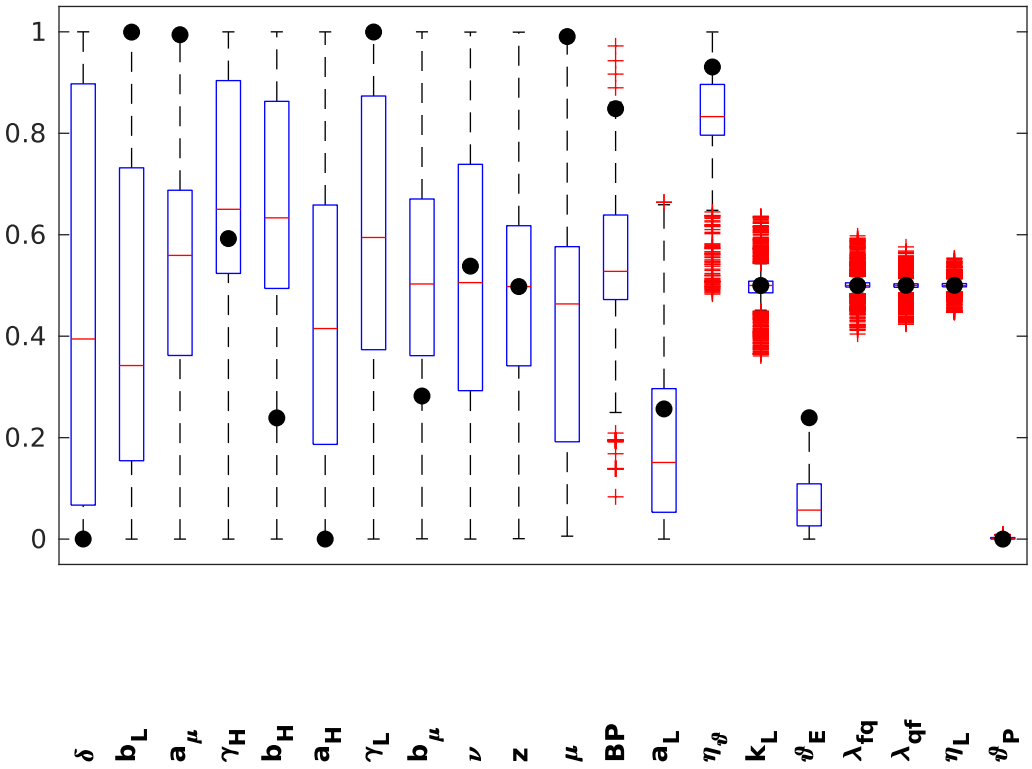
12.2. Estimated parameters with their intervals

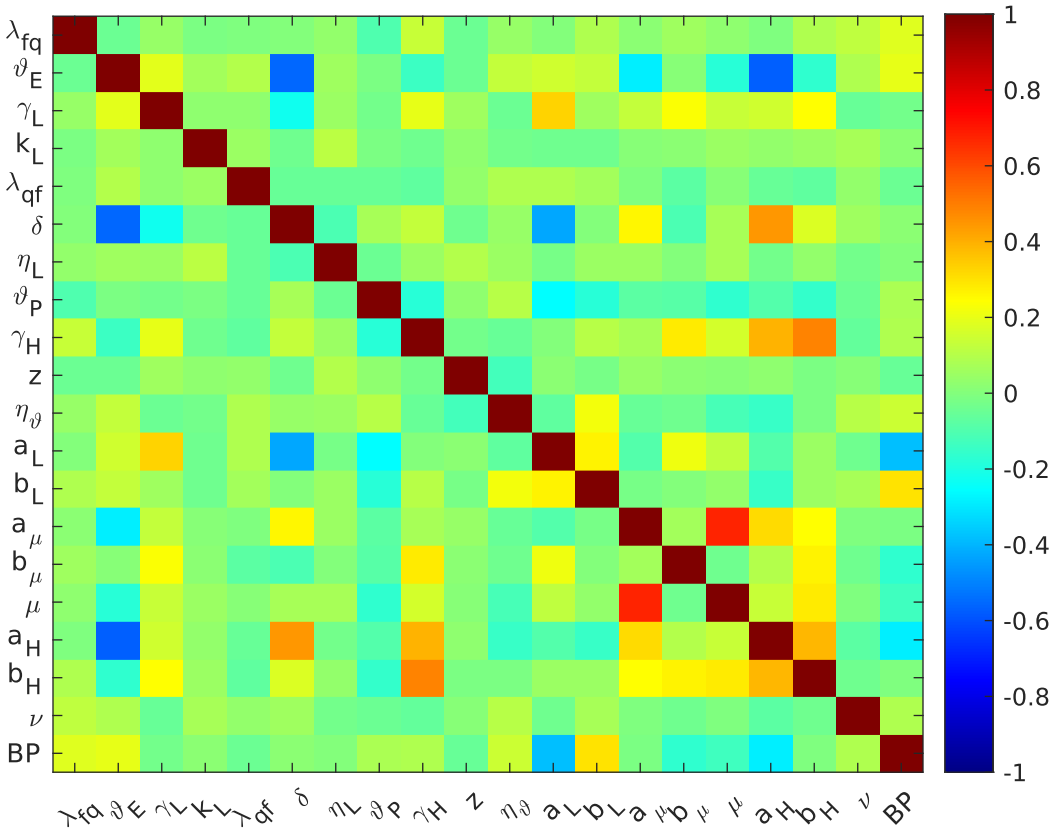
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

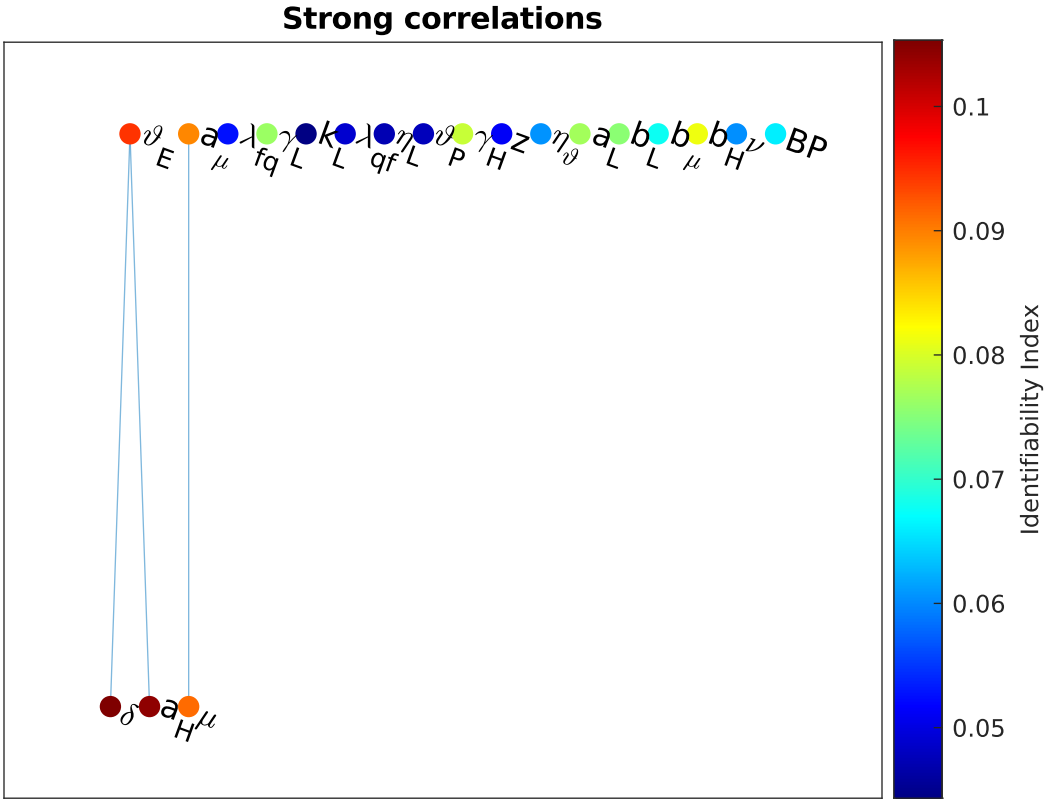
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.025'	'1'	'0.4999'	'0.5'	'0.0528'
\vartheta_E	'0.1709'	'0.2748'	'0.0572'	'0.2393'	'0.0944'
\gamma_L	'0.418'	'1'	'0.5946'	'0.9996'	'0.0764'
k_L	'1'	'10'	'5.5'	'5.4997'	'0.0443'
\lambda_{qf}	'0'	'1'	'0.5'	'0.5003'	'0.0489'
\delta	'0'	'0'	'0.0592'	'0'	'0.1053'
\eta_L	'0'	'1'	'0.5001'	'0.5002'	'0.0473'
\vartheta_P	'0'	'0'	'0.0017'	'0'	'0.0477'
\gamma_H	'0.1661'	'1'	'0.6502'	'0.5924'	'0.079'
z	'0'	'30'	'14.9339'	'14.9339'	'0.0514'
\eta_\vartheta	'0.3215'	'1'	'0.8329'	'0.9307'	'0.0607'
a_L	'3.1097'	'5.0366'	'3.1149'	'4.5927'	'0.0769'
b_L	'7.7975'	'15'	'5.7899'	'14.9921'	'0.0755'
a_\mu	'7.3411'	'15'	'8.8295'	'14.9202'	'0.0896'
b_\mu	'1'	'12.97'	'8.0413'	'4.9492'	'0.0678'
\mu	'0'	'1'	'0.4636'	'0.9906'	'0.0911'
a_H	'1'	'6.302'	'6.811'	'1.0015'	'0.1042'
b_H	'3.66'	'15'	'9.866'	'4.345'	'0.0814'
\nu	'51.4916'	'500'	'252.8255'	'269.0434'	'0.0604'
BP	'465.5584'	'469.3657'	'463.5'	'469.2722'	'0.066'

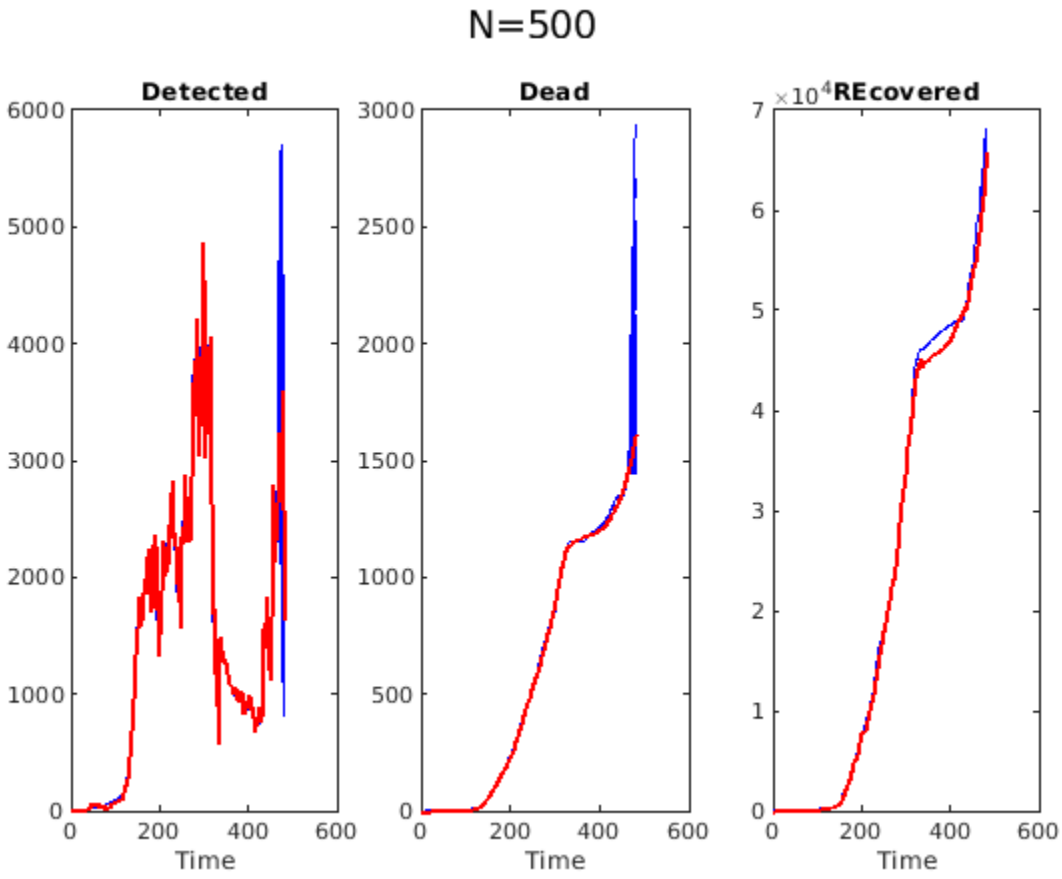
12.3. Identifiability analisys




λ_{fq}
ϑ_E
γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
BP
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.1
0.09
0.08
0.07
0.06
0.05

12.4. Uncertainty analisys



Chapter 13. Extension number13

13.1. Basic information

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

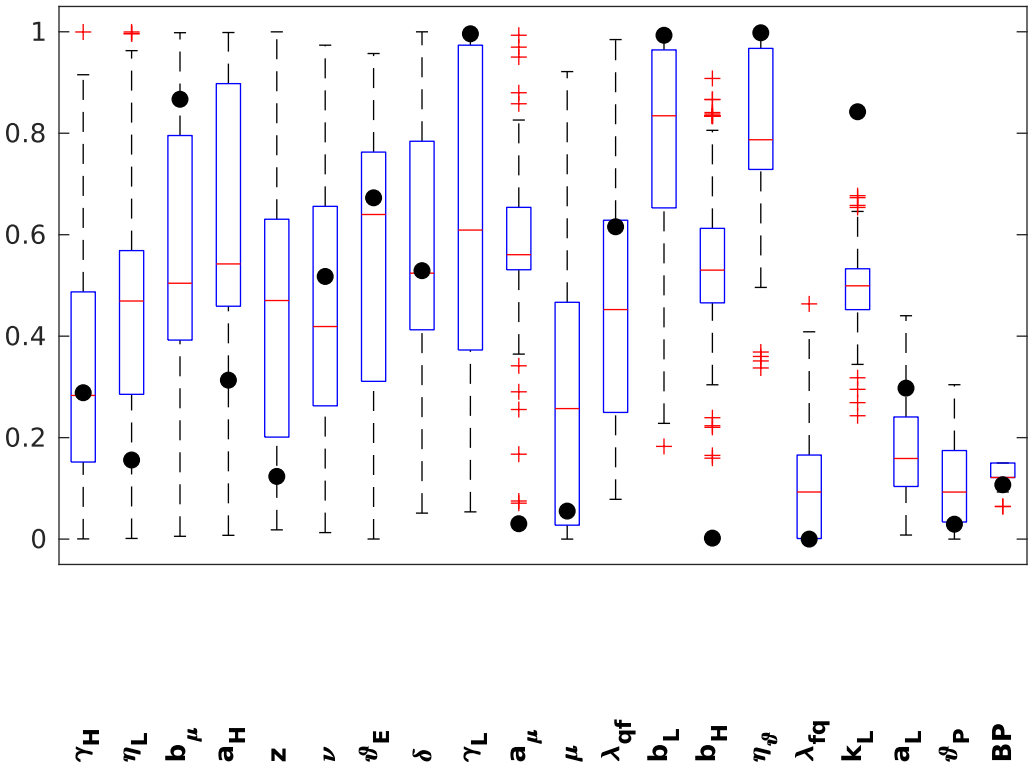
The number of estimations needed to perform the validation was1000.

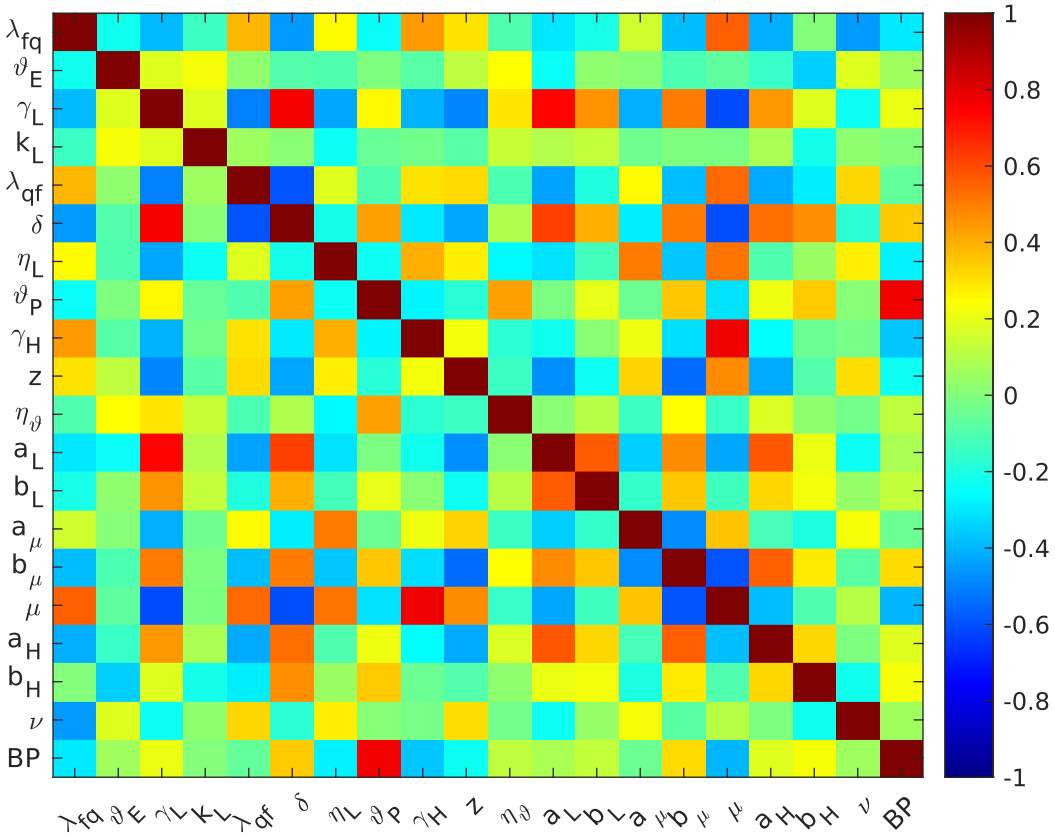
13.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0494'	'0.1379'	'0.0936'	'0'	'0.1525'
\vartheta_E	'0.5761'	'0.7036'	'0.6398'	'0.6727'	'0.1198'
\gamma_L	'0.5401'	'0.6782'	'0.6091'	'0.996'	'0.2525'
k_L	'5.143'	'5.843'	'5.493'	'8.5811'	'0.086'
\lambda_{qf}	'0.4003'	'0.5046'	'0.4524'	'0.6156'	'0.1831'
\delta	'0.069'	'0.0882'	'0.0786'	'0.0794'	'0.2551'
\eta_L	'0.4135'	'0.5251'	'0.4693'	'0.1559'	'0.1695'
\vartheta_P	'0.0705'	'0.1149'	'0.0927'	'0.0294'	'0.1154'
\gamma_H	'0.2306'	'0.3357'	'0.2832'	'0.2885'	'0.1506'
z	'12.1863'	'16.0293'	'14.1078'	'3.7074'	'0.1721'
\eta_\vartheta	'0.7387'	'0.8324'	'0.7855'	'0.998'	'0.109'
a_L	'2.9031'	'3.5459'	'3.2245'	'5.1658'	'0.1777'
b_L	'11.9915'	'13.3526'	'12.6721'	'14.9036'	'0.1363'
a_\mu	'7.9417'	'9.7442'	'8.843'	'1.4242'	'0.1558'
b_\mu	'7.1761'	'8.9453'	'8.0607'	'13.1376'	'0.2361'
\mu	'0.1982'	'0.3163'	'0.2573'	'0.0552'	'0.2602'
a_H	'7.7259'	'9.4609'	'8.5934'	'5.3864'	'0.1953'
b_H	'7.6955'	'9.1498'	'8.4227'	'1.027'	'0.1252'
\nu	'178.3134'	'240.6701'	'209.4918'	'258.846'	'0.1249'
BP	'483.143'	'483.857'	'483.5'	'482.5'	'0.0947'

13.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
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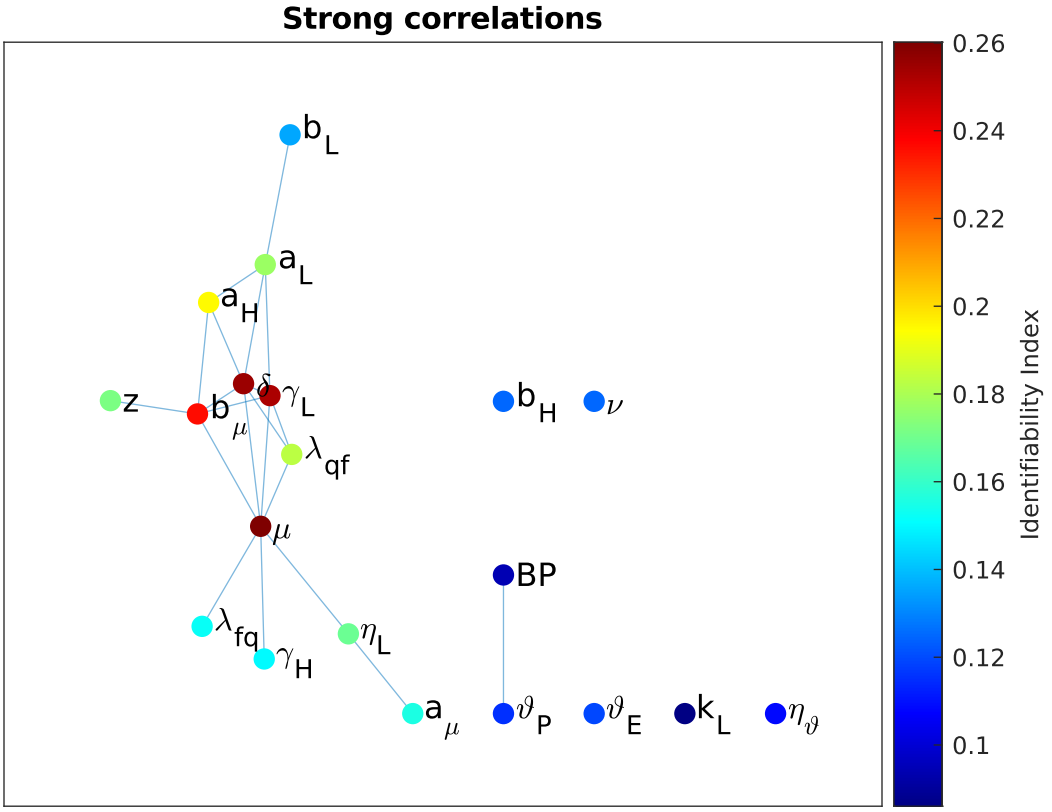
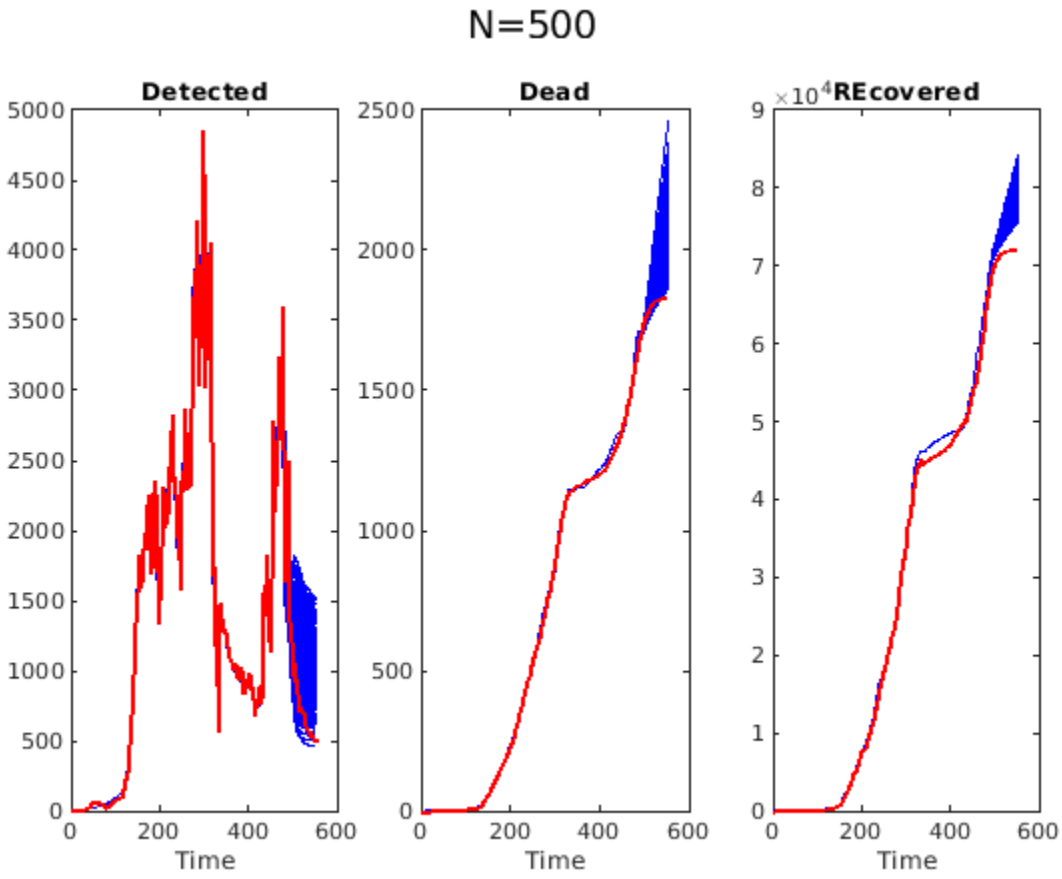
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
b L
a L
a H
z
b μ
γ L
λ qf
μ
λ fq
γ H
η L
a μ
b H
ν
BP
ϑ P
ϑ E
k L
η ϑ
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
Identifiability Index

13.4. Uncertainty analisys



Chapter 14. Extension number14

14.1. Basic information

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

The number of estimations needed to perform the validation was1000.

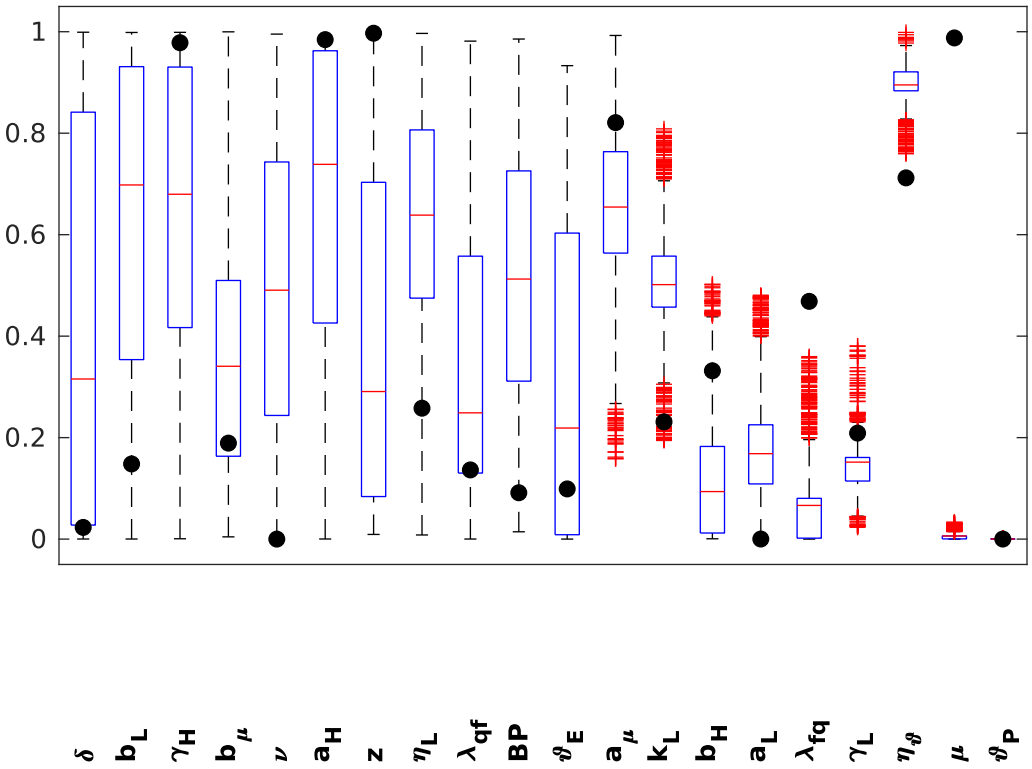
14.2. Estimated parameters with their intervals

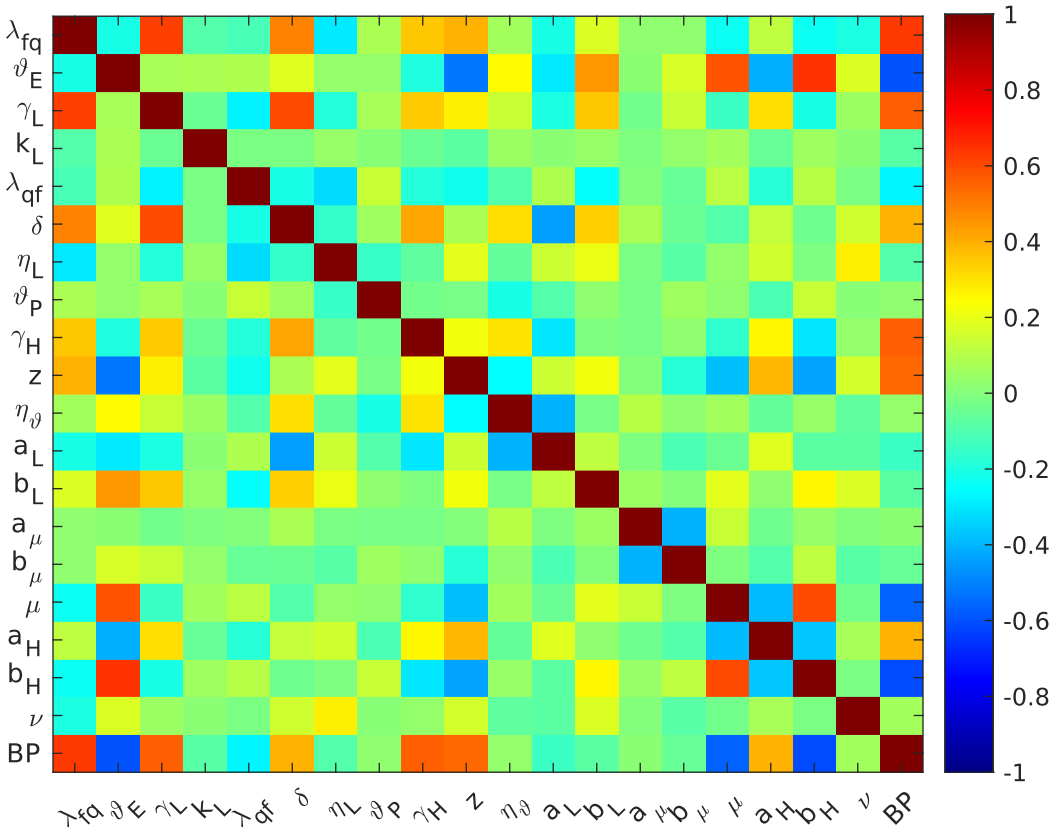
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

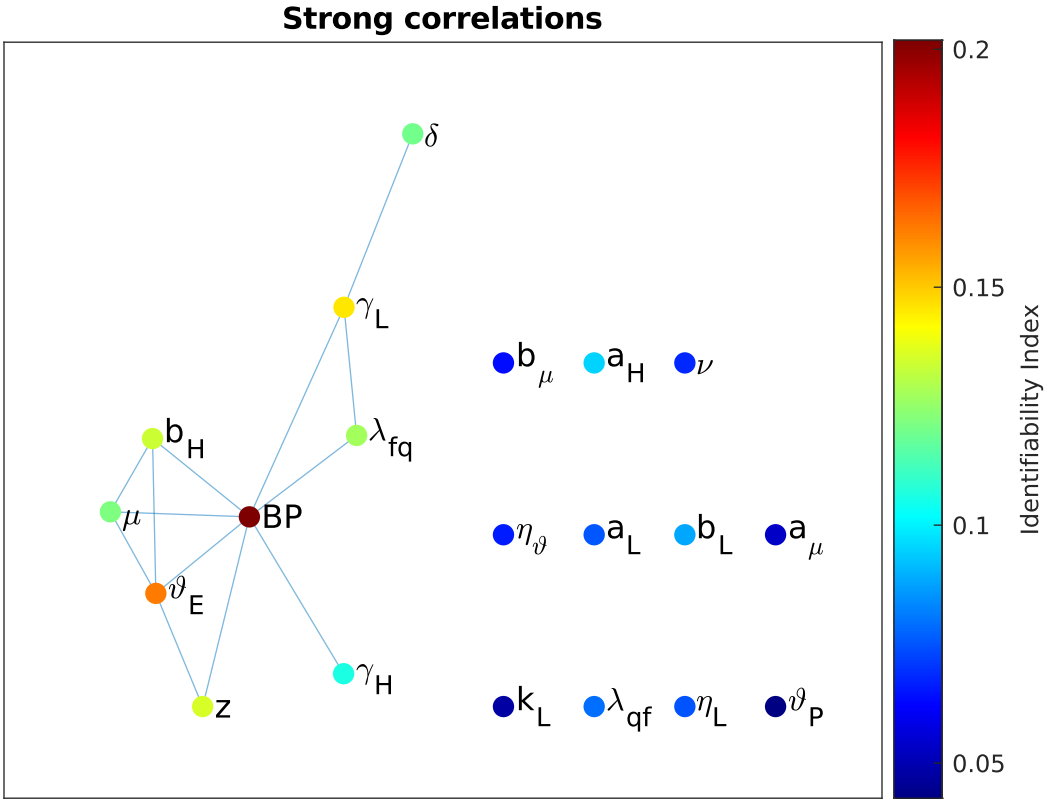
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4616'	'0.4686'	'0.0664'	'0.4686'	'0.1275'
\vartheta_E	'0.0982'	'0.1052'	'0.2189'	'0.0989'	'0.1622'
\gamma_L	'0.1982'	'0.209'	'0.1517'	'0.2089'	'0.1456'
k_L	'1.85'	'7.2323'	'5.5139'	'3.0793'	'0.048'
\lambda_{qf}	'0.1363'	'0.139'	'0.2489'	'0.1364'	'0.0795'
\delta	'0.0028'	'0.0066'	'0.0473'	'0.0035'	'0.1203'
\eta_L	'0.2543'	'0.29'	'0.6385'	'0.258'	'0.0752'
\vartheta_P	'0.0001'	'0.0002'	'0.0002'	'0.0001'	'0.0426'
\gamma_H	'0.5744'	'0.9787'	'0.6797'	'0.9783'	'0.1063'
z	'29.4489'	'30'	'8.7245'	'29.9101'	'0.1359'
\eta_\vartheta	'0.6354'	'0.7205'	'0.8952'	'0.712'	'0.0664'
a_L	'1'	'1.612'	'3.3574'	'1.002'	'0.0759'
b_L	'1'	'4.347'	'10.7718'	'3.0739'	'0.0882'
a_\mu	'7.5421'	'13.9366'	'10.1621'	'12.4922'	'0.0533'
b_\mu	'1.2179'	'5.0143'	'5.7692'	'3.6484'	'0.064'
\mu	'0.5695'	'1'	'0.0062'	'0.9878'	'0.1217'
a_H	'8.4559'	'15'	'11.34'	'14.7819'	'0.0954'
b_H	'1.94'	'5.6583'	'2.3114'	'5.6442'	'0.1339'
\nu	'0.0011'	'0.0095'	'245.3056'	'0.0046'	'0.0682'
BP	'491.2301'	'559.1053'	'535.3031'	'491.5'	'0.2019'

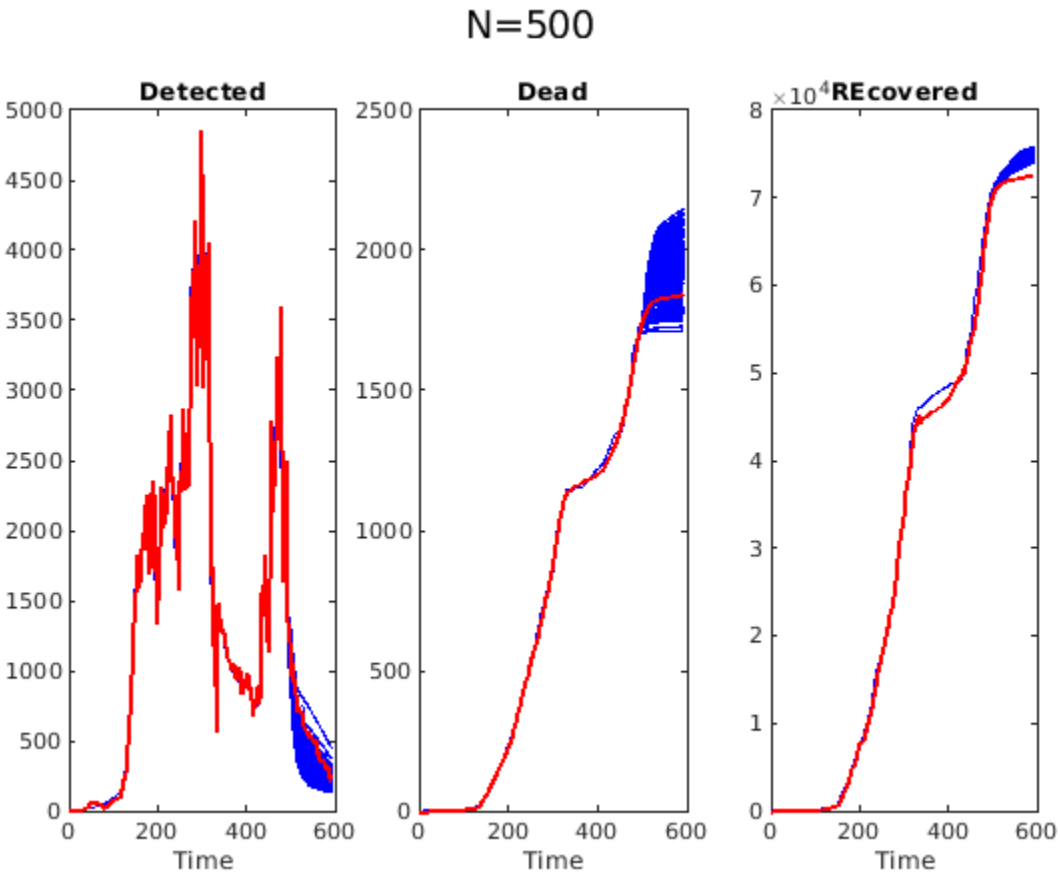
14.3. Identifiability analisys




λ_{fq}
ϑ_E
γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
BP
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
δ
γ L
b H
λ fq
μ
BP
ϑ E
γ H
z
b μ
a H
ν
η ϑ
a L
b L
a μ
k L
λ qf
η L
ϑ P
0.2
0.15
0.1
0.05
Identifiability Index

14.4. Uncertainty analisys



Chapter 15. Extension number15

15.1. Basic information

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

The number of estimations needed to perform the validation was1000.

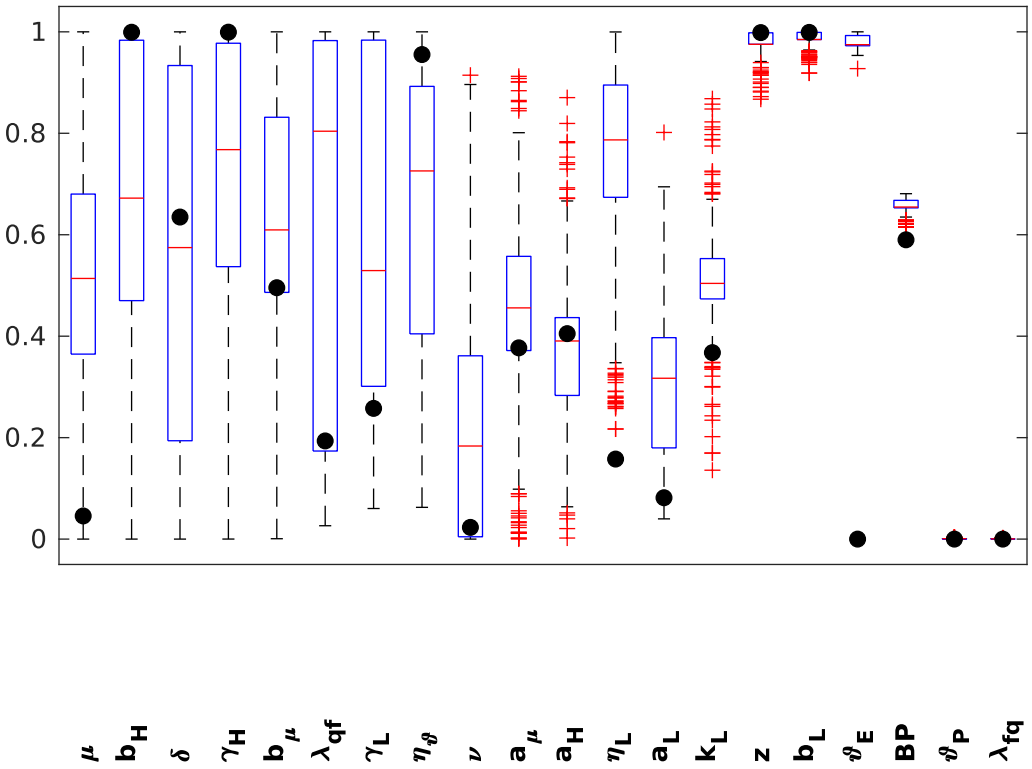
15.2. Estimated parameters with their intervals

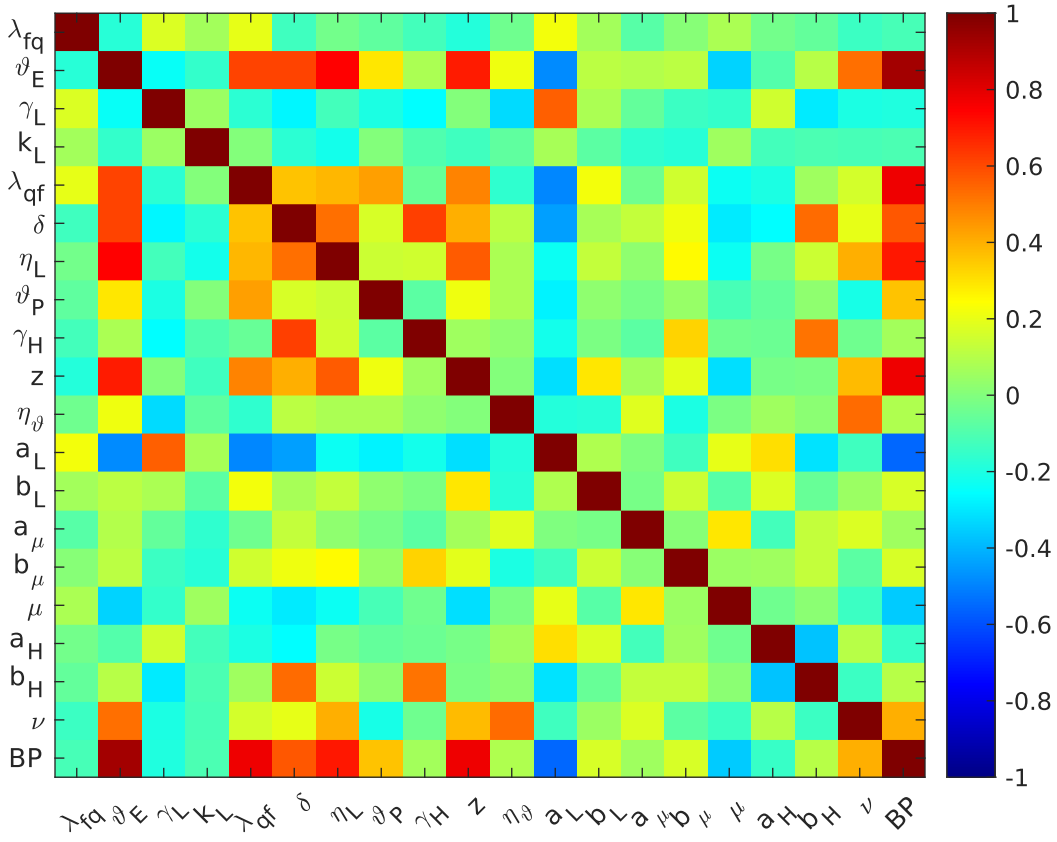
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0'	'0.0004'	'0'	'0.0631'
\vartheta_E	'0'	'0'	'0.9747'	'0'	'0.2303'
\gamma_L	'0'	'0.5218'	'0.5293'	'0.2577'	'0.1382'
k_L	'1.18'	'10'	'5.5367'	'4.3083'	'0.0874'
\lambda_{qf}	'0.1898'	'0.5168'	'0.8041'	'0.1935'	'0.18'
\delta	'0.0705'	'0.0966'	'0.0862'	'0.0952'	'0.2251'
\eta_L	'0.0923'	'0.3437'	'0.787'	'0.1578'	'0.1876'
\vartheta_P	'0'	'0'	'0.0008'	'0'	'0.0661'
\gamma_H	'0.4818'	'1'	'0.7678'	'0.9993'	'0.1381'
z	'17.3155'	'30'	'29.2626'	'29.9544'	'0.1573'
\eta_\vartheta	'0.5003'	'1'	'0.7258'	'0.9552'	'0.1149'
a_L	'1'	'14.3'	'5.4392'	'2.1418'	'0.1423'
b_L	'1'	'15'	'14.7872'	'14.9847'	'0.0731'
a_\mu	'5.9944'	'14.6398'	'7.3812'	'6.2784'	'0.0848'
b_\mu	'1.252'	'13.6'	'9.5333'	'7.9379'	'0.1027'
\mu	'0'	'0.1027'	'0.5138'	'0.0456'	'0.1086'
a_H	'6.3673'	'9.1297'	'6.468'	'6.6704'	'0.0931'
b_H	'10.7485'	'15'	'10.4103'	'14.9887'	'0.1413'
\nu	'10.8707'	'19.8162'	'91.7542'	'11.5508'	'0.1398'
BP	'643.6687'	'646.8878'	'654.5'	'644.6819'	'0.1934'

15.3. Identifiability analisys




λ_{fq}
ϑ_E
γ_L
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
η_ϑ
a_L
b_L
a_μ
b_μ
μ
a_H
b_H
ν
BP
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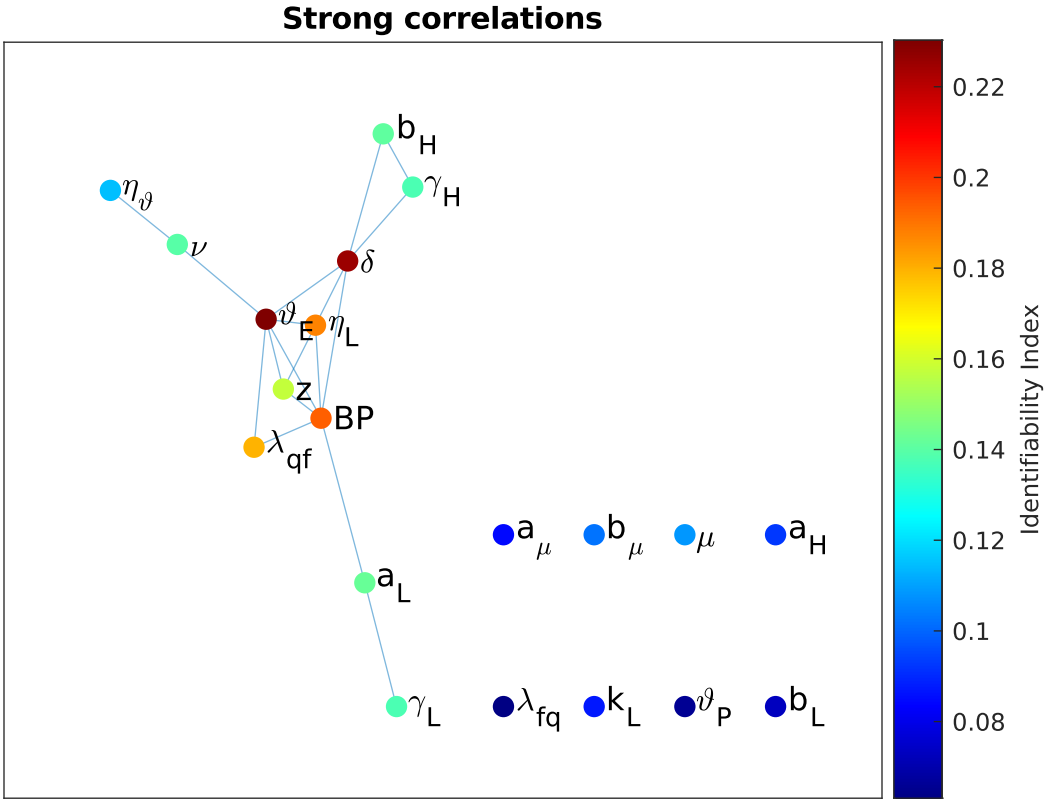
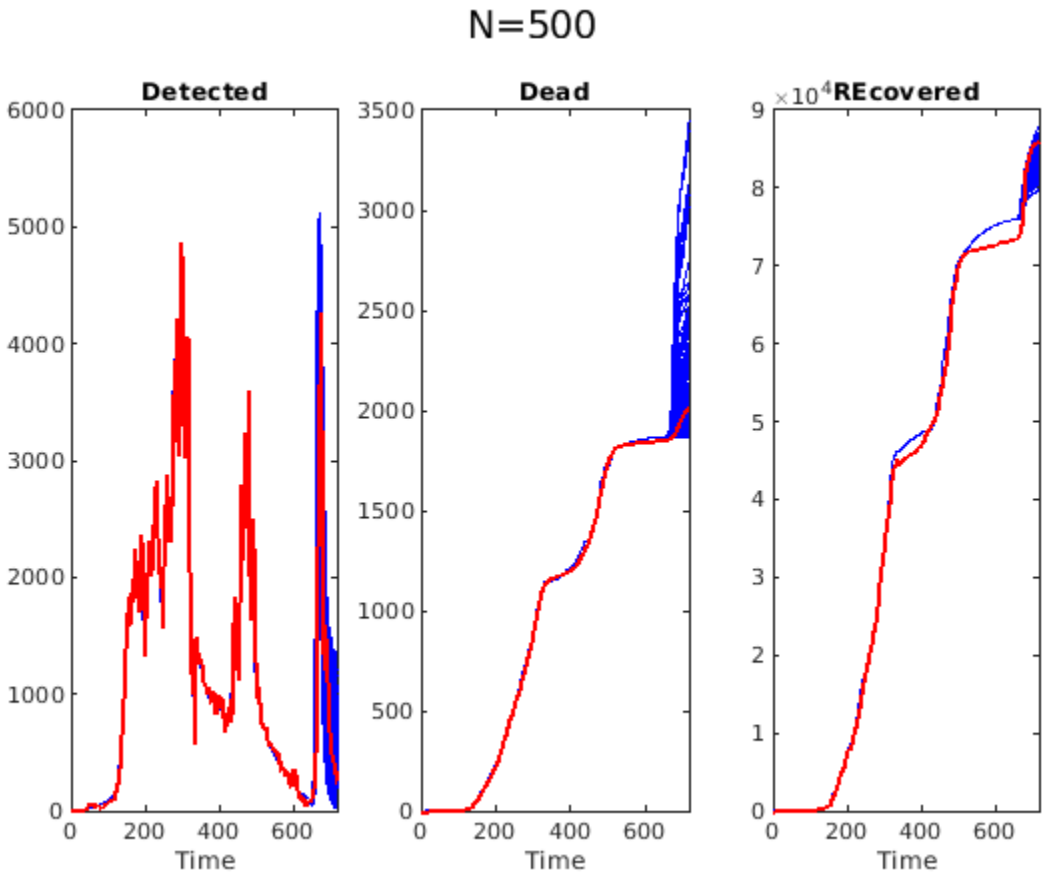
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
b H
γ H
η ϑ
ν
δ
ϑ E
η L
z
BP
λ qf
a L
γ L
a μ
b μ
μ
a H
λ fq
k L
ϑ P
b L
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
Identifiability Index

15.4. Uncertainty analisys