Validation process forMAGDALENA

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 85. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

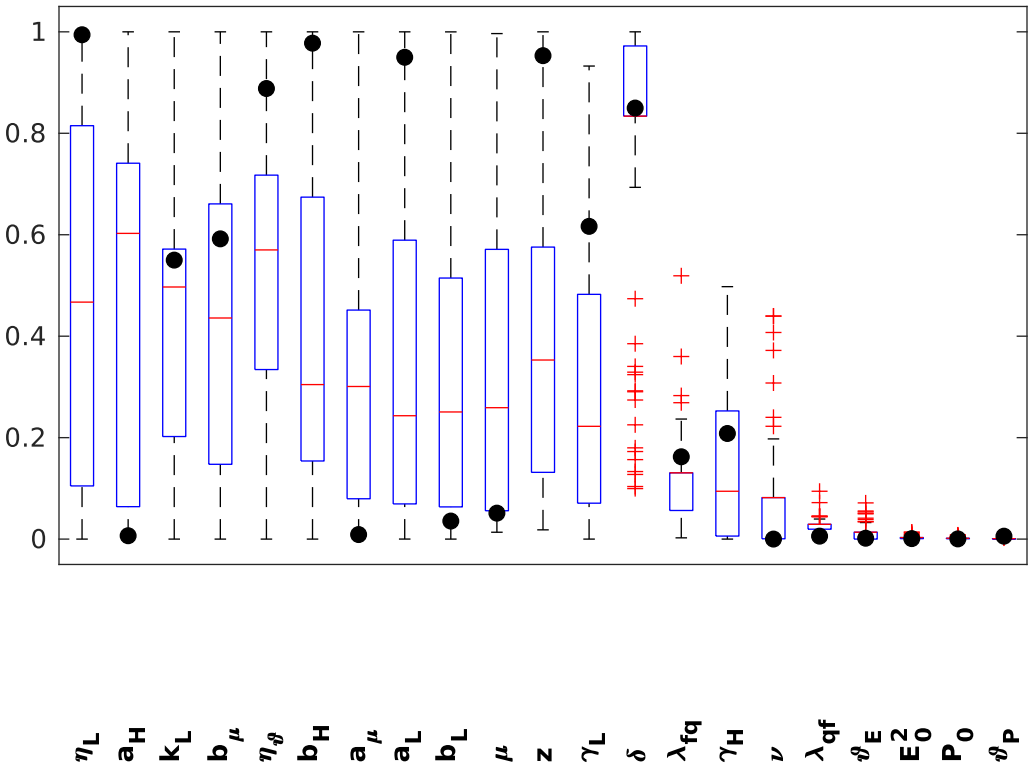
1.2. Estimated parameters with their intervals

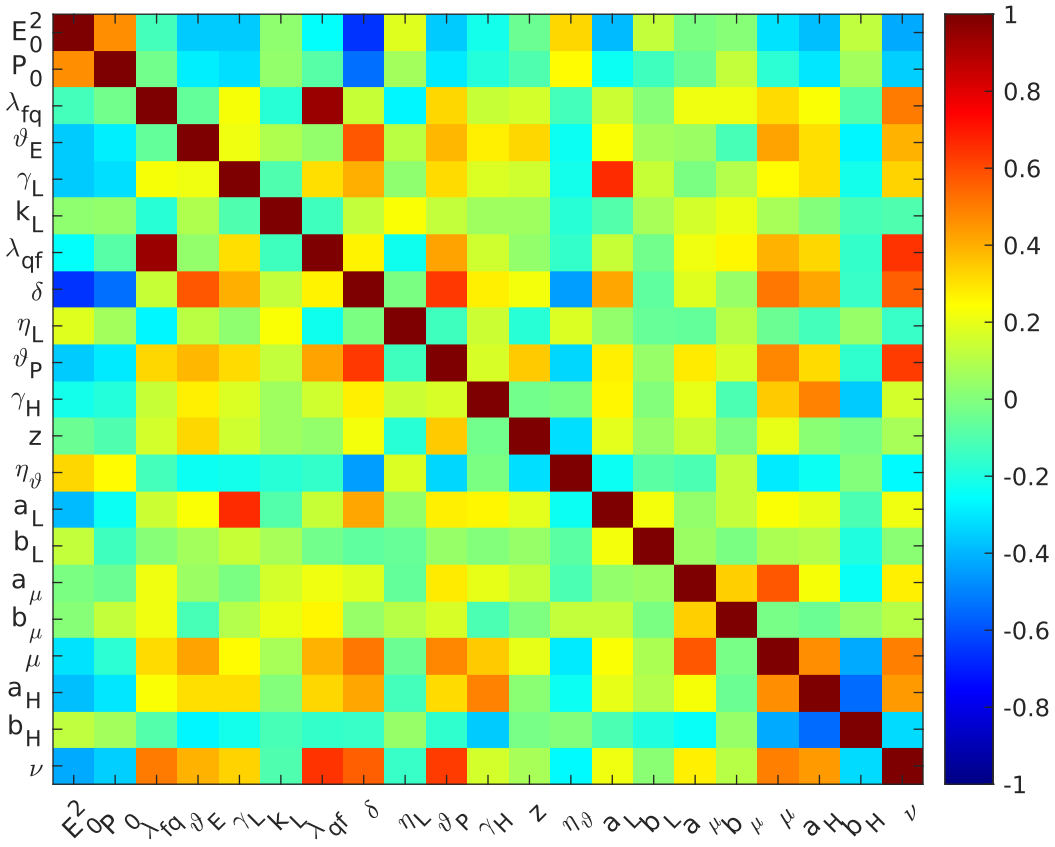
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
E^2_0	'1.6388'	'2.1931'	'6.0736'	'1.9344'	'0.1267'
P_0	'0.0983'	'0.1722'	'0.6611'	'0.1563'	'0.1138'
\lambda_{fq}	'0.1603'	'0.1624'	'0.1306'	'0.1623'	'0.1981'
\vartheta_E	'0.0006'	'0.0037'	'0.0136'	'0.0017'	'0.1246'
\gamma_L	'0.1829'	'0.6185'	'0.2223'	'0.6165'	'0.1579'
k_L	'1'	'8.7164'	'5.4728'	'5.9498'	'0.1176'
\lambda_{qf}	'0.0057'	'0.0061'	'0.0292'	'0.0058'	'0.1719'
\delta	'0.0941'	'0.1327'	'0.1251'	'0.1275'	'0.2786'
\eta_L	'0.961'	'0.9956'	'0.4672'	'0.9942'	'0.1354'
\vartheta_P	'0.0053'	'0.0089'	'0.0008'	'0.0058'	'0.1595'
\gamma_H	'0.1459'	'0.2084'	'0.0943'	'0.2082'	'0.122'
z	'27.7579'	'28.8369'	'10.5907'	'28.5902'	'0.1216'
\eta_\vartheta	'0.8459'	'0.943'	'0.5701'	'0.8883'	'0.1357'
a_L	'10.1755'	'14.3167'	'4.405'	'14.2977'	'0.1611'
b_L	'1.1564'	'2.1214'	'4.5088'	'1.4981'	'0.115'
a_\mu	'1.0829'	'1.6285'	'5.2119'	'1.1252'	'0.1346'
b_\mu	'7.1517'	'13.3848'	'7.1022'	'9.2866'	'0.1266'
\mu	'0.0472'	'0.0676'	'0.259'	'0.0512'	'0.1913'
a_H	'1'	'8.0682'	'9.4373'	'1.0928'	'0.1846'
b_H	'6.6744'	'15'	'5.2644'	'14.6872'	'0.1546'
\nu	'0.0095'	'0.0717'	'40.8897'	'0.0319'	'0.2376'

1.3. Identifiability analisys

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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
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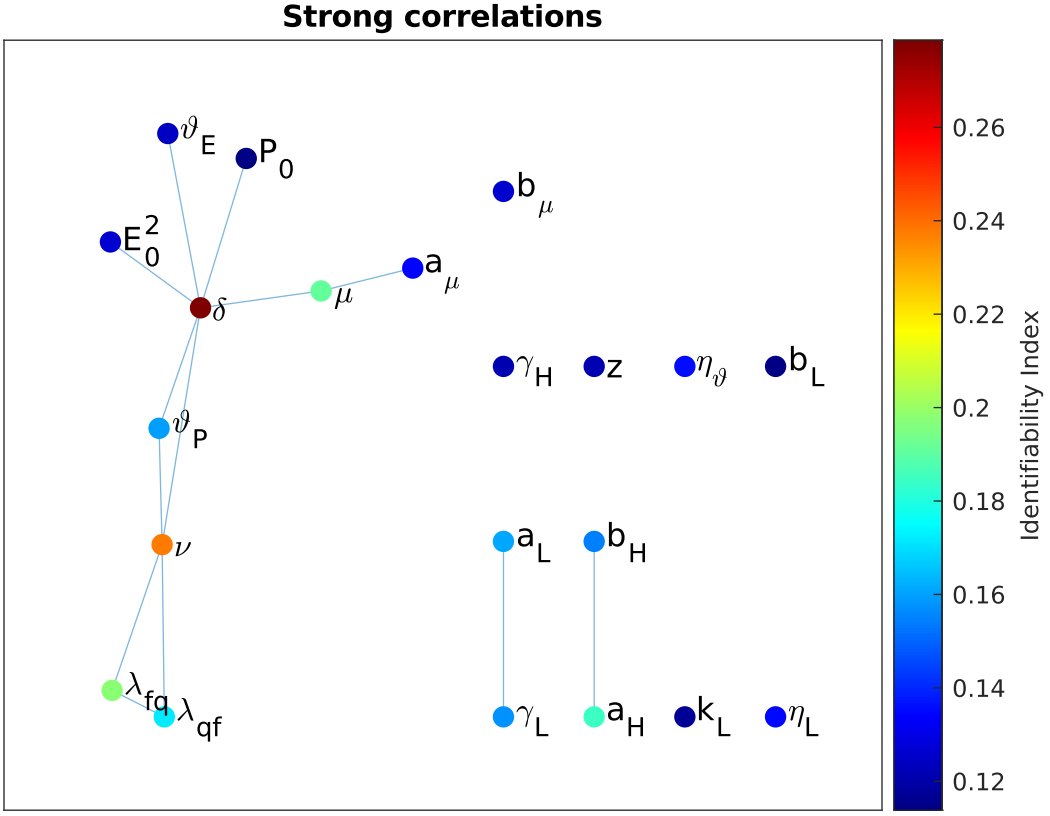
-0.4
-0.6
-0.8
-1


Strong correlations
ϑ_E
P_0
E_0^2
a_μ
μ
δ
b_μ
γ_H
z
η_ϑ
b_L
ϑ_P
ν
a_L
b_H
λ_{fq}
λ_{qf}
γ_L
a_H
k_L
η_L
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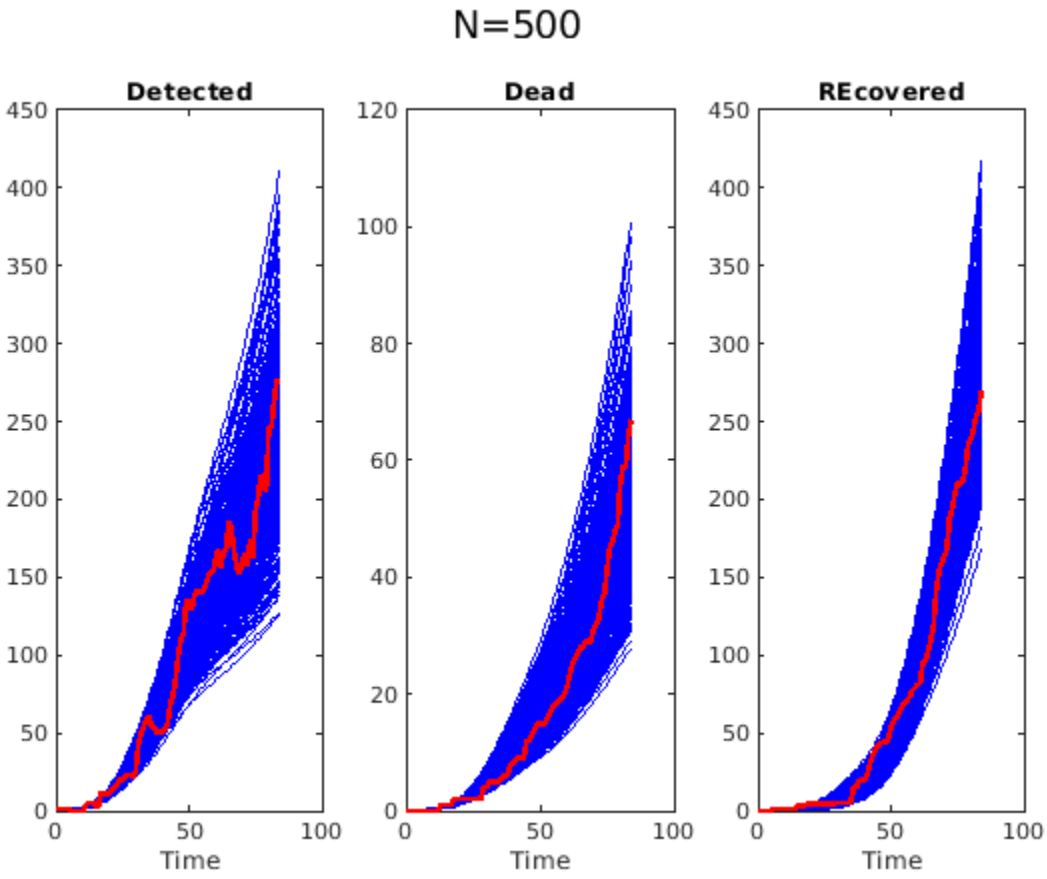
0.24
0.22
0.2
0.18
0.16
0.14
0.12
Identifiability Index

1.4. Uncertainty analisys



Chapter 2. Extension number2

2.1. Basic information

The extension to be validated consists of the time series from the data85 to the 119. The status of the validation is: COMPLETED.

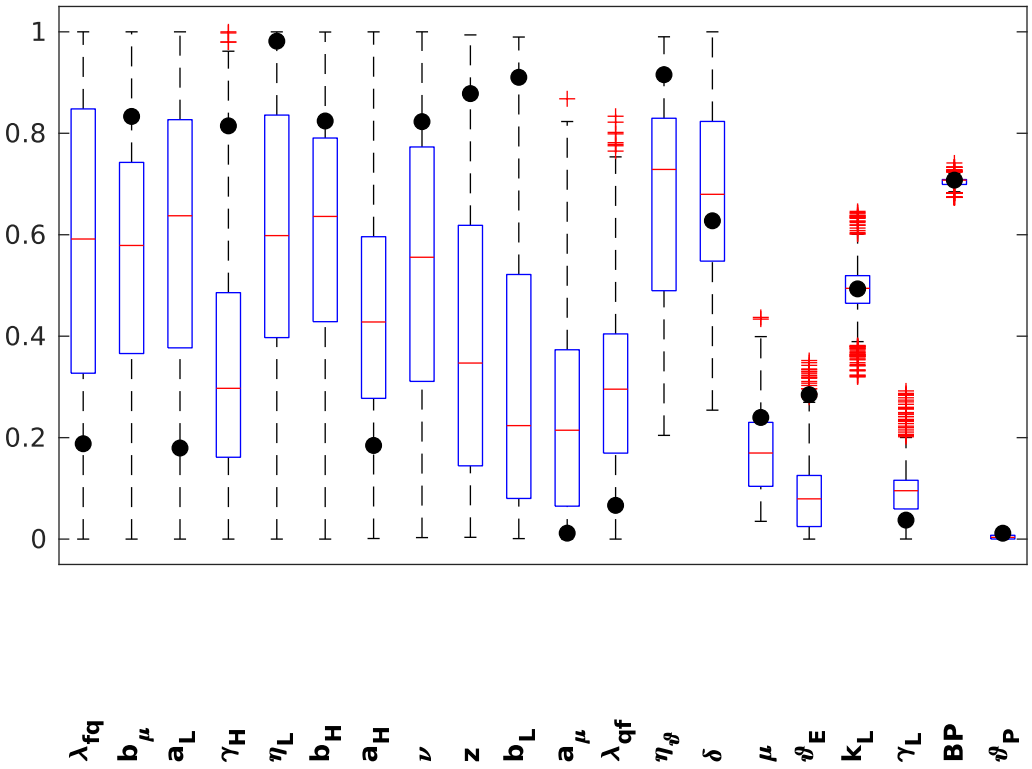
The number of estimations needed to perform the validation was1000.

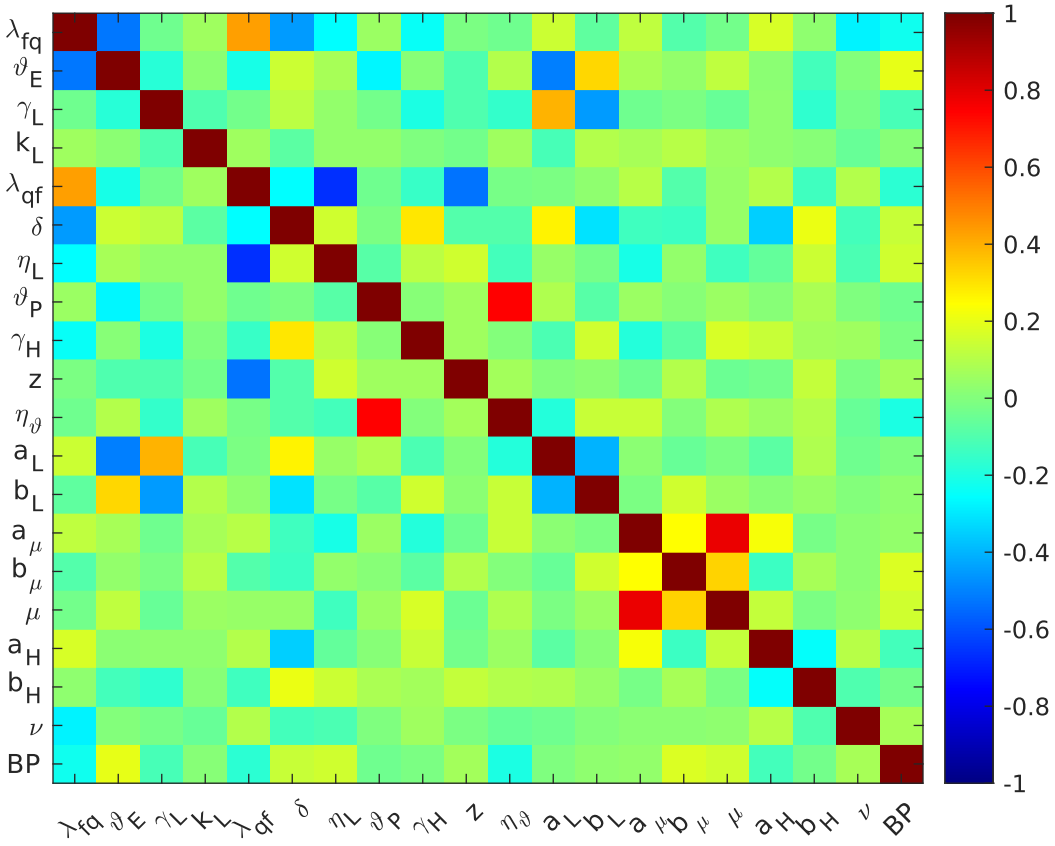
2.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.5598'	'0.6234'	'0.5916'	'0.188'	'0.1095'
\vartheta_E	'0.062'	'0.0969'	'0.0794'	'0.2847'	'0.1052'
\gamma_L	'0.0735'	'0.1175'	'0.0955'	'0.0375'	'0.0747'
k_L	'5.3259'	'5.5725'	'5.4492'	'5.4393'	'0.0512'
\lambda_{qf}	'0.2744'	'0.3185'	'0.2965'	'0.0665'	'0.1112'
\delta	'0.099'	'0.1049'	'0.102'	'0.0941'	'0.0868'
\eta_L	'0.5681'	'0.6285'	'0.5983'	'0.9816'	'0.0998'
\vartheta_P	'0.003'	'0.004'	'0.0035'	'0.0116'	'0.0598'
\gamma_H	'0.2718'	'0.3227'	'0.2972'	'0.8146'	'0.0759'
z	'9.471'	'11.3523'	'10.4117'	'26.3464'	'0.0891'
\eta_\vartheta	'0.7049'	'0.7526'	'0.7287'	'0.9155'	'0.0906'
a_L	'9.4676'	'10.3796'	'9.9236'	'3.5136'	'0.1019'
b_L	'3.7105'	'4.5565'	'4.1335'	'13.7448'	'0.0848'
a_\mu	'3.7036'	'4.3081'	'4.0058'	'1.1641'	'0.0906'
b_\mu	'8.6974'	'9.5105'	'9.104'	'12.6652'	'0.0774'
\mu	'0.1593'	'0.1801'	'0.1697'	'0.2398'	'0.0769'
a_H	'6.6451'	'7.3394'	'6.9922'	'3.5845'	'0.075'
b_H	'9.5098'	'10.3004'	'9.9051'	'12.5394'	'0.0755'
\nu	'262.8323'	'292.7818'	'277.807'	'411.4637'	'0.0698'
BP	'84.3127'	'84.6873'	'84.5'	'84.5'	'0.0509'

2.3. 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
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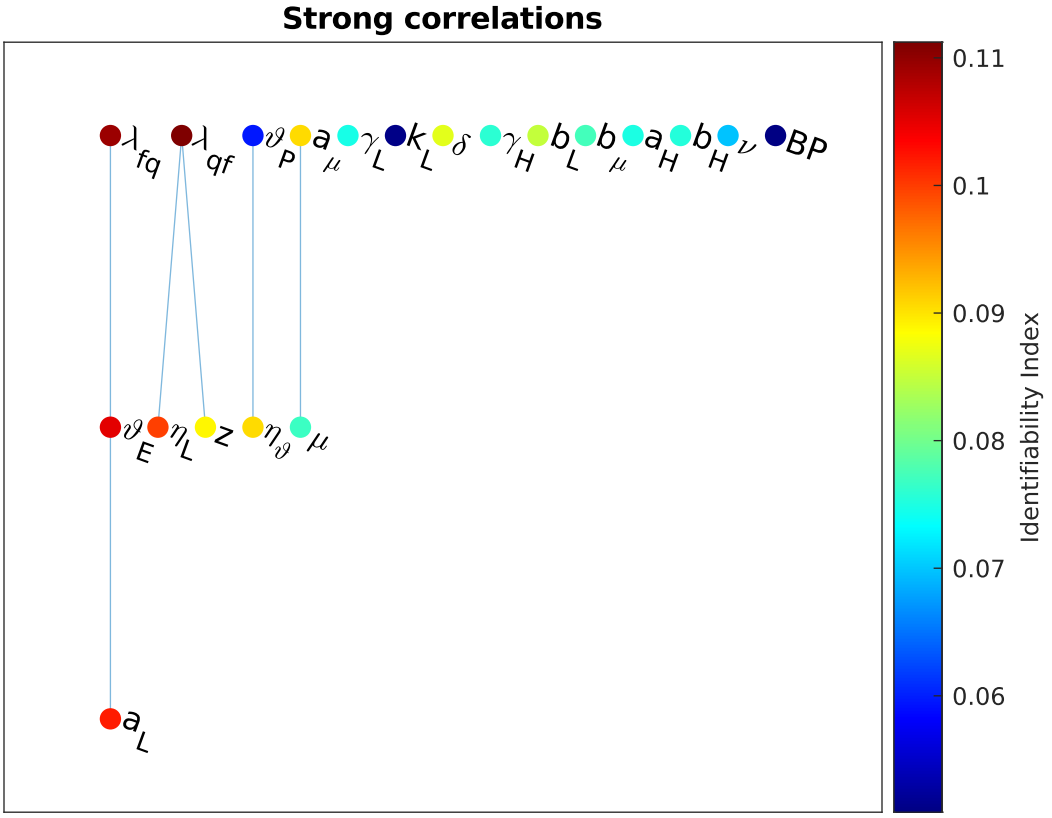
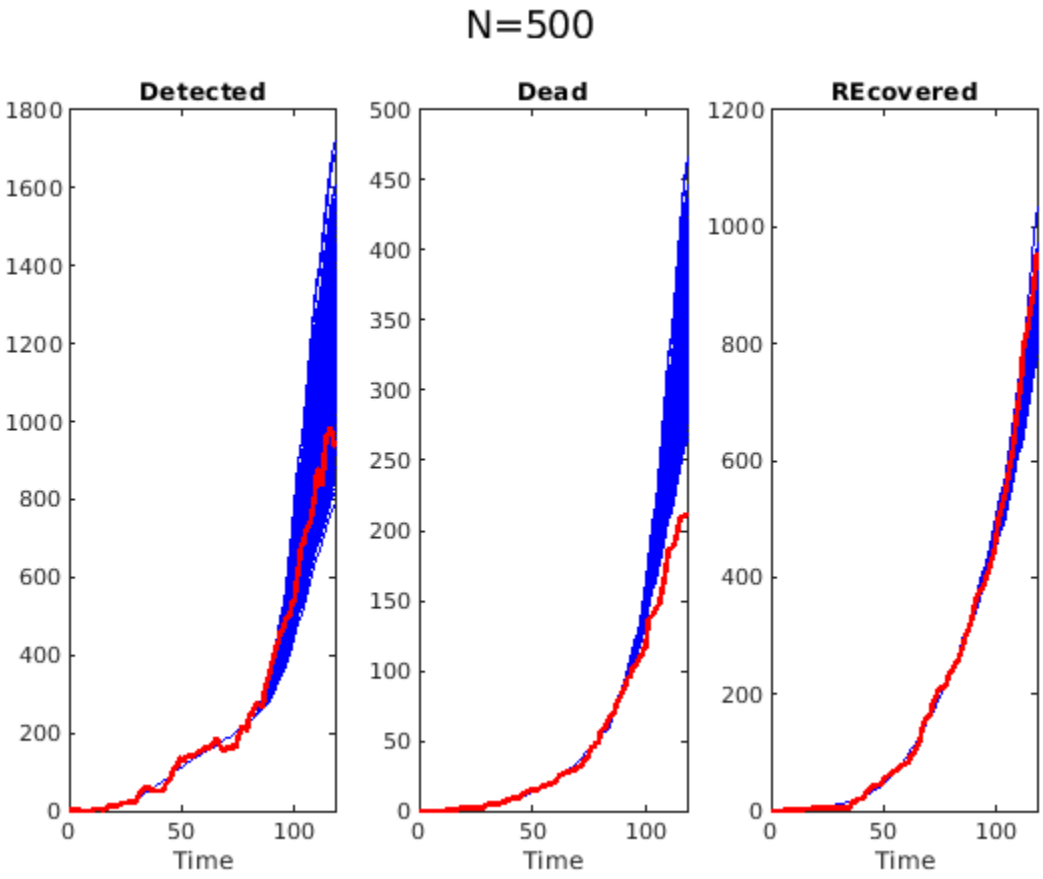
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
λ_{qf}
ϑ_P
a_μ
γ_L
k_L
δ
γ_H
b_L
b_μ
a_H
b_H
ν
BP
ϑ_E
η_L
z
η_ϑ
μ
a_L
0.11
0.1
0.09
0.08
0.07
0.06
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 data119 to the 171. The status of the validation is: COMPLETED.

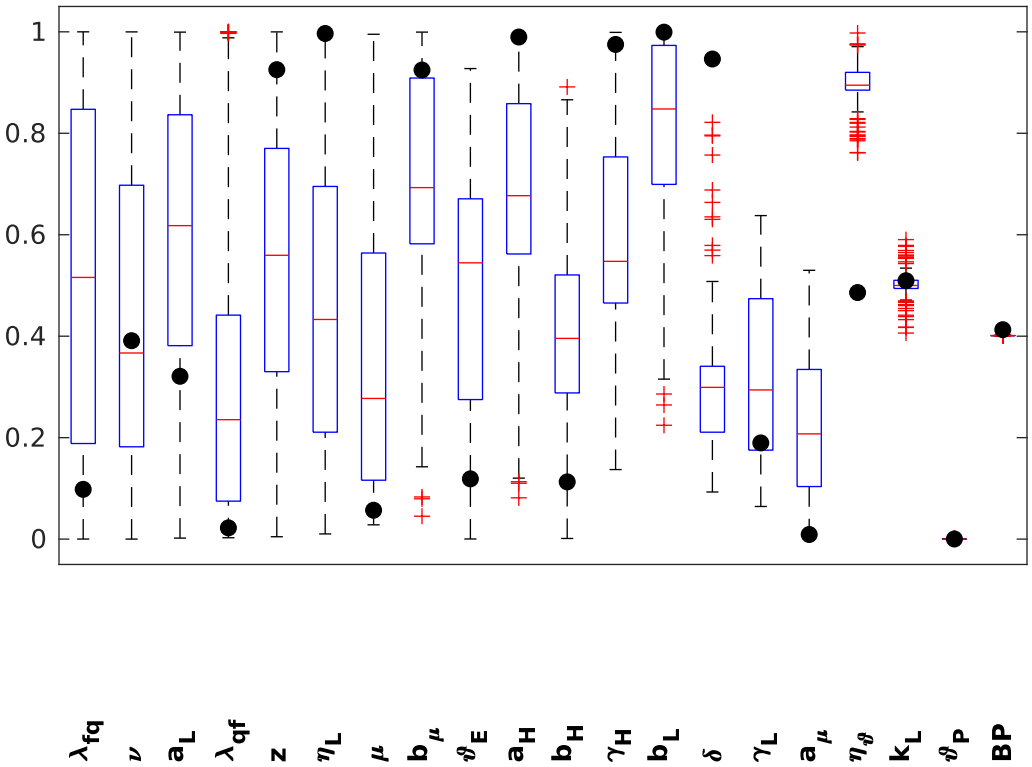
The number of estimations needed to perform the validation was1000.

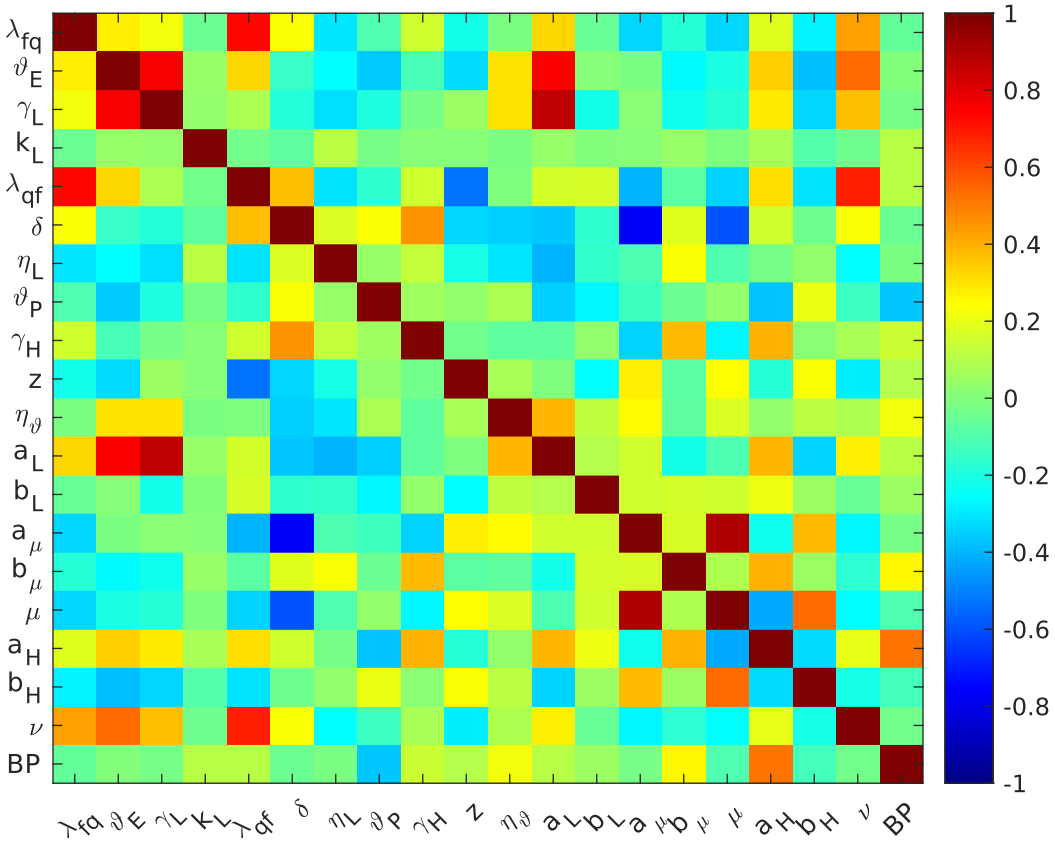
3.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4459'	'0.5858'	'0.5158'	'0.0981'	'0.1631'
\vartheta_E	'0.4965'	'0.5927'	'0.5446'	'0.1187'	'0.1781'
\gamma_L	'0.2605'	'0.3276'	'0.294'	'0.1896'	'0.142'
k_L	'5.286'	'5.7139'	'5.4999'	'5.584'	'0.0588'
\lambda_{qf}	'0.1748'	'0.296'	'0.2354'	'0.0222'	'0.1887'
\delta	'0.0359'	'0.0542'	'0.045'	'0.142'	'0.1748'
\eta_L	'0.372'	'0.4939'	'0.433'	'0.9967'	'0.1293'
\vartheta_P	'0'	'0.0007'	'0.0001'	'0.0002'	'0.0651'
\gamma_H	'0.5028'	'0.5923'	'0.5475'	'0.9751'	'0.1062'
z	'14.8355'	'18.7335'	'16.7845'	'27.7629'	'0.1456'
\eta_\vartheta	'0.8575'	'0.9311'	'0.8943'	'0.486'	'0.0988'
a_L	'8.8574'	'10.445'	'9.6512'	'5.4935'	'0.1741'
b_L	'12.1469'	'13.5926'	'12.8697'	'14.9912'	'0.1062'
a_\mu	'3.4366'	'4.3711'	'3.9038'	'1.1269'	'0.1448'
b_\mu	'10.0391'	'11.3476'	'10.6934'	'13.9459'	'0.1127'
\mu	'0.2154'	'0.3392'	'0.2773'	'0.0569'	'0.1871'
a_H	'9.7411'	'11.167'	'10.454'	'14.8566'	'0.1509'
b_H	'5.9699'	'7.1103'	'6.5401'	'2.5789'	'0.1289'
\nu	'152.2088'	'214.6579'	'183.4334'	'195.5552'	'0.1697'
BP	'119.2472'	'119.7528'	'119.5'	'120.4991'	'0.0703'

3.3. 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
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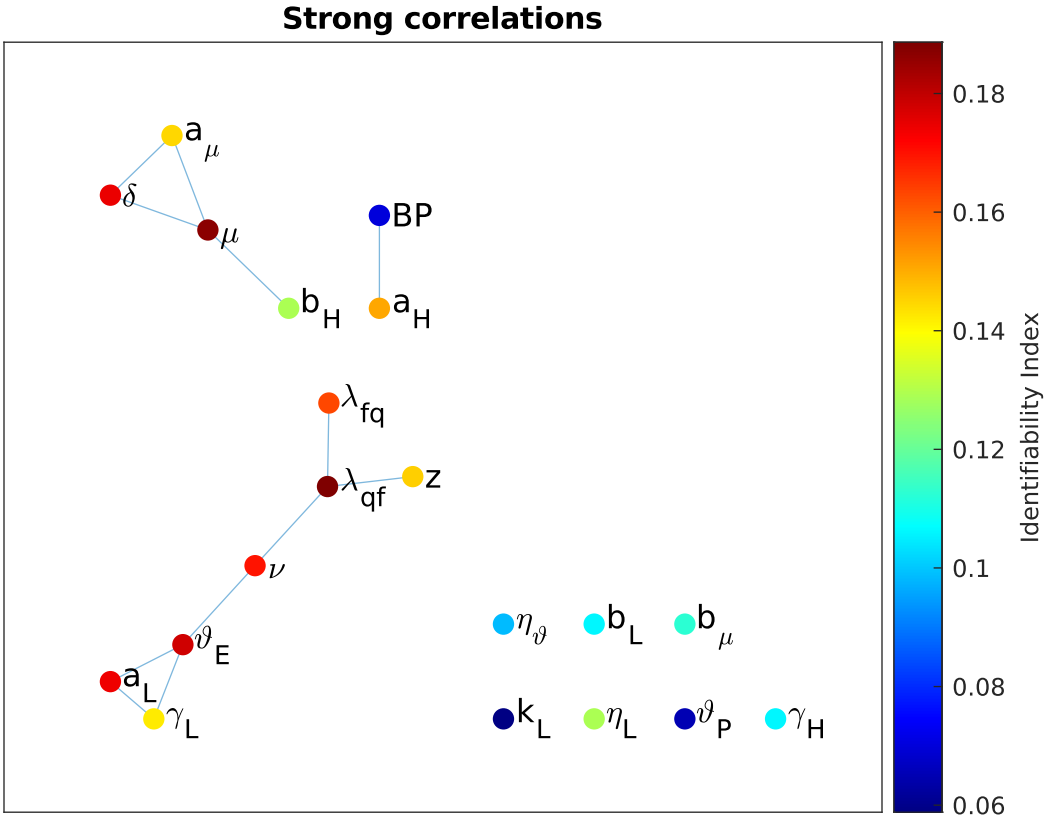
Strong correlations
a_μ
δ
μ
BP
b_H
a_H
λ_{fq}
λ_{qf}
z
ν
ϑ_E
a_L
γ_L
η_ϑ
b_L
b_μ
k_L
η_L
ϑ_P
γ_H
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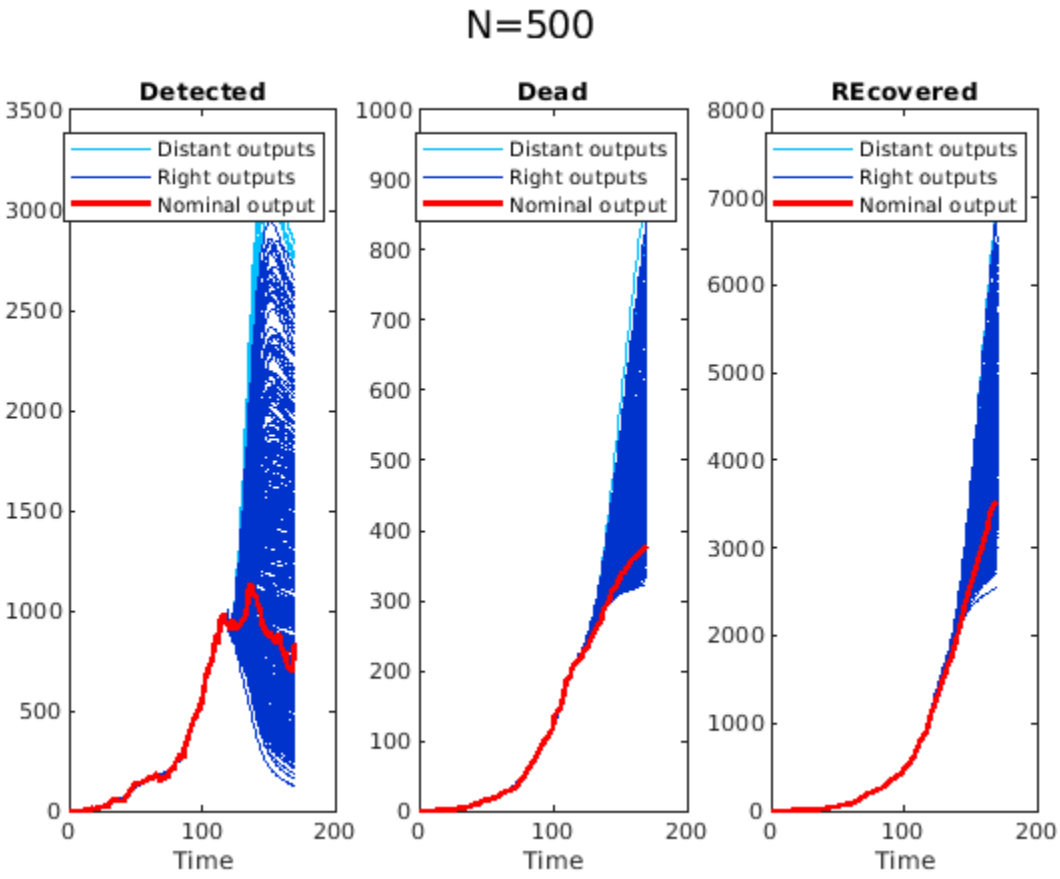
0.14
0.12
0.1
0.08
0.06
Identifiability Index

3.4. Uncertainty analisys



Chapter 4. Extension number4

4.1. Basic information

The extension to be validated consists of the time series from the data171 to the 234. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

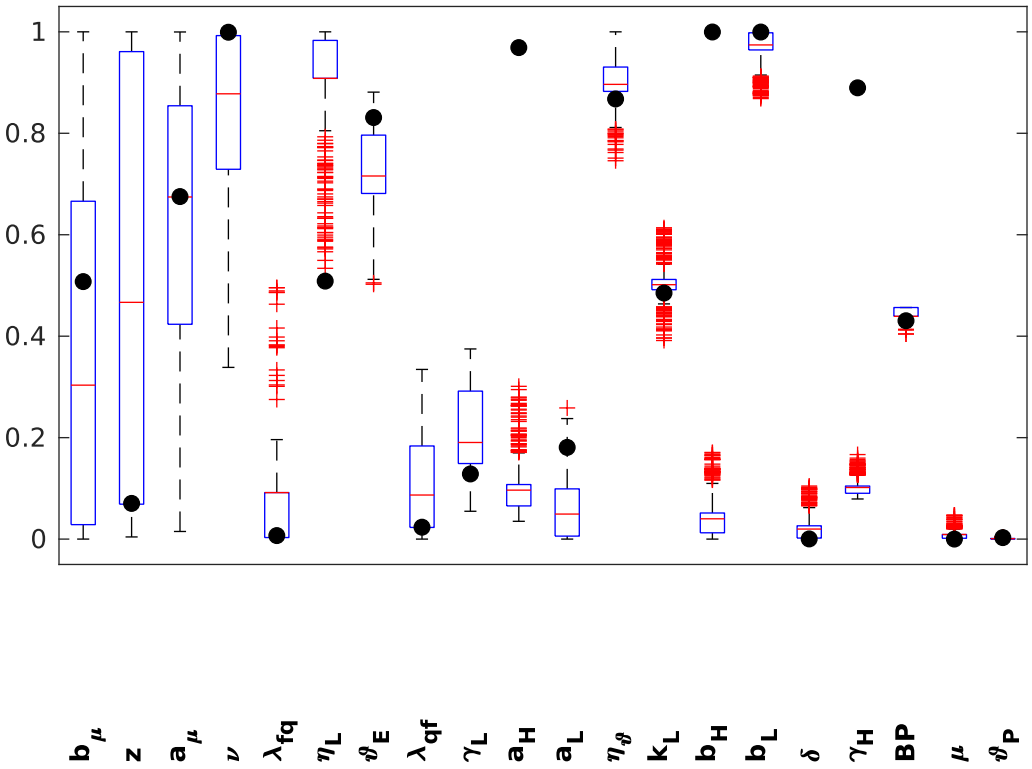
4.2. Estimated parameters with their intervals

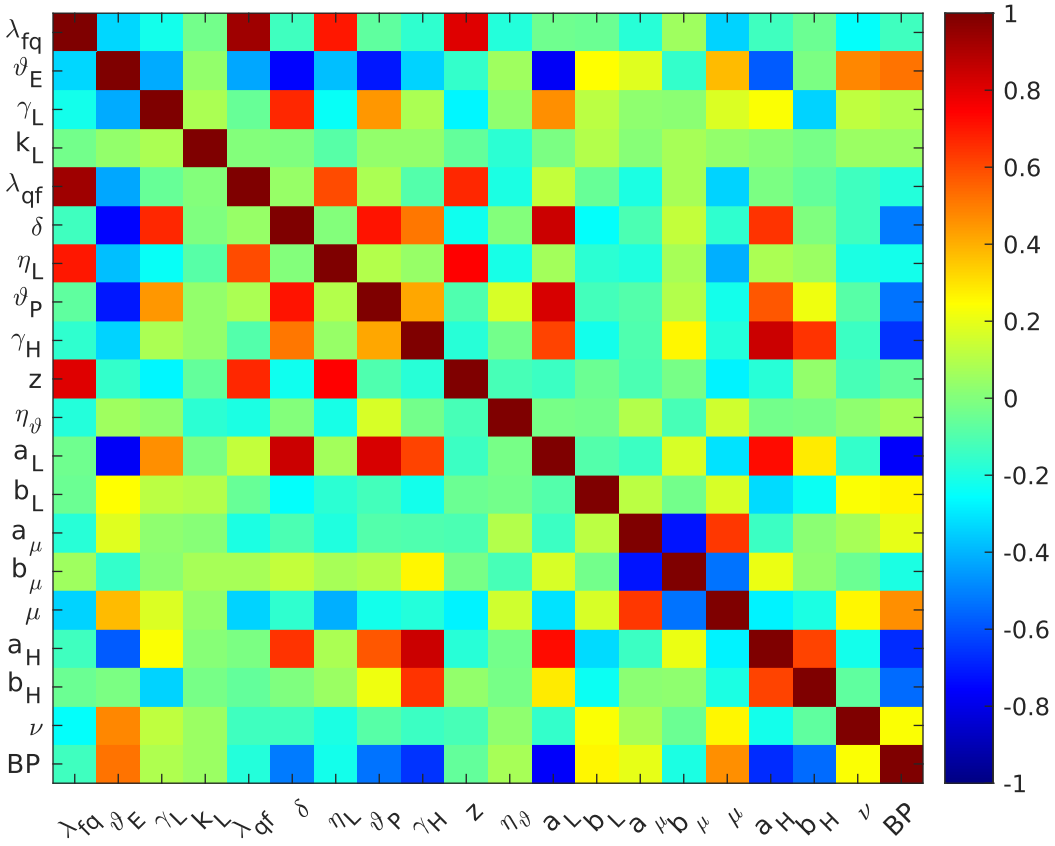
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0061'	'0.0183'	'0.0917'	'0.0069'	'0.1674'
\vartheta_E	'0.758'	'0.8393'	'0.7158'	'0.831'	'0.1875'
\gamma_L	'0.0986'	'0.1431'	'0.1905'	'0.1284'	'0.1059'
k_L	'1.225'	'9.5613'	'5.5137'	'5.3658'	'0.051'
\lambda_{qf}	'0.0161'	'0.0304'	'0.0869'	'0.0235'	'0.1261'
\delta	'0'	'0.0001'	'0.003'	'0.0001'	'0.2077'
\eta_L	'0.3734'	'0.5719'	'0.9083'	'0.5086'	'0.155'
\vartheta_P	'0.0001'	'0.0041'	'0.0008'	'0.003'	'0.1577'
\gamma_H	'0.4868'	'1'	'0.1017'	'0.8896'	'0.179'
z	'1.2565'	'2.6953'	'14.0017'	'2.1113'	'0.1629'
\eta_\vartheta	'0.7582'	'1'	'0.8964'	'0.8677'	'0.0638'
a_L	'2.217'	'3.5681'	'1.6909'	'3.531'	'0.1965'
b_L	'9.8847'	'15'	'14.6384'	'14.9943'	'0.0714'
a_\mu	'1.28'	'15'	'10.4418'	'10.4535'	'0.1201'
b_\mu	'1.28'	'15'	'5.2487'	'8.1066'	'0.1266'
\mu	'0'	'0.0001'	'0.0091'	'0.0001'	'0.1285'
a_H	'8.5706'	'15'	'2.3512'	'14.565'	'0.2266'
b_H	'6.1271'	'15'	'1.5603'	'14.9952'	'0.129'
\nu	'268.4119'	'500'	'438.9099'	'499.5957'	'0.0894'
BP	'168.055'	'180.3534'	'169.5'	'168.5'	'0.1933'

4.3. Identifiability analisys

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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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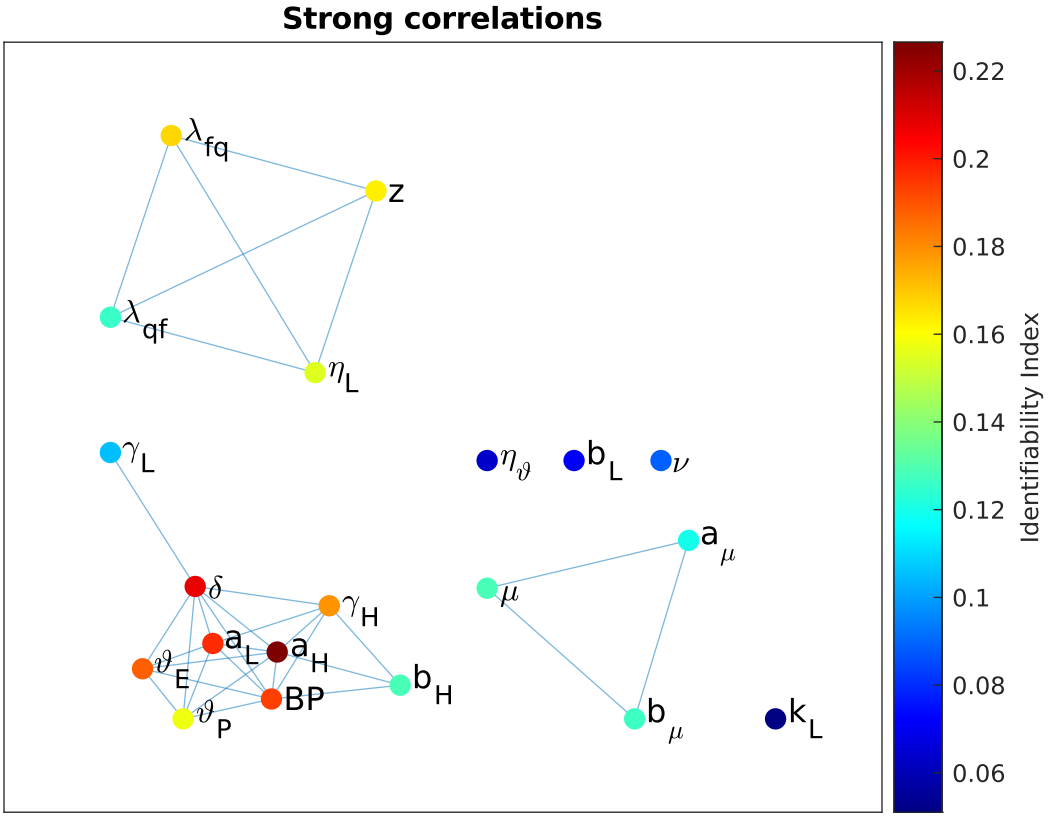
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
z
λ_{qf}
η_L
γ_L
η_ϑ
b_L
ν
a_μ
μ
δ
γ_H
a_L
a_H
ϑ_E
b_H
BP
ϑ_P
b_μ
k_L
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0.2
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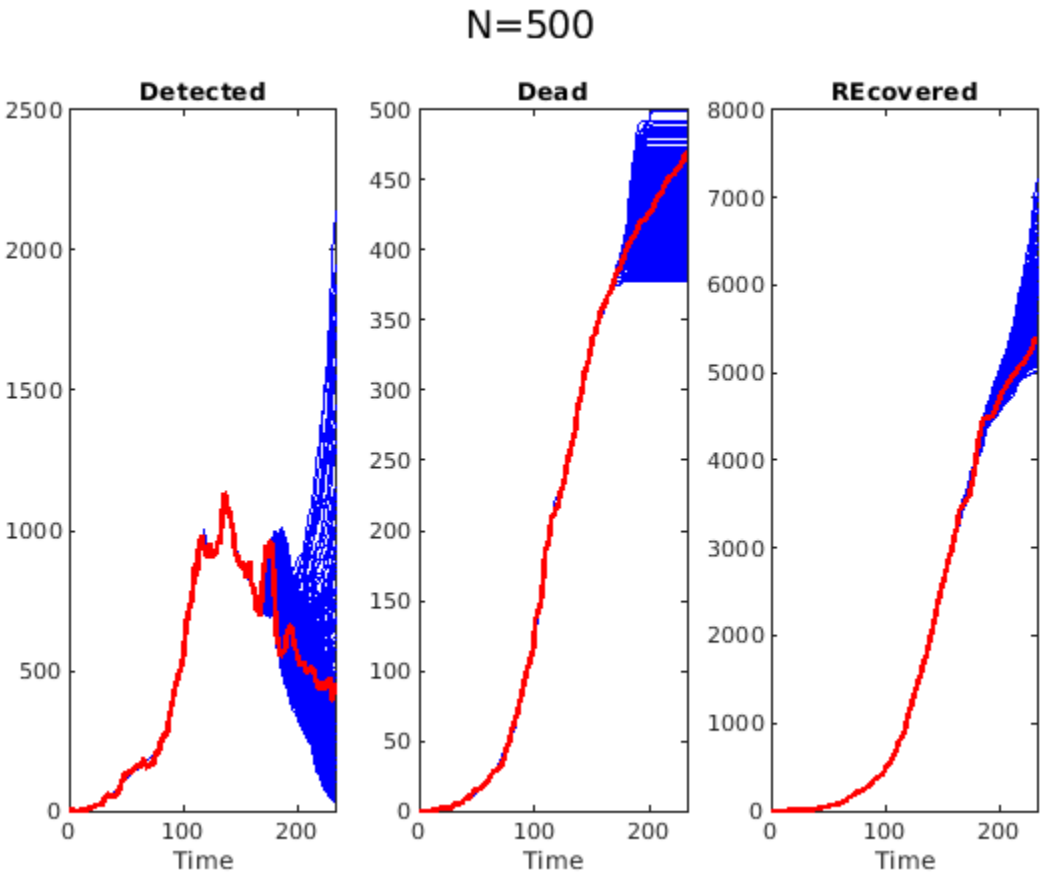
0.16
0.14
0.12
0.1
0.08
0.06
Identifiability Index

4.4. Uncertainty analisys



Chapter 5. Extension number5

5.1. Basic information

The extension to be validated consists of the time series from the data234 to the 273. The status of the validation is: COMPLETED.

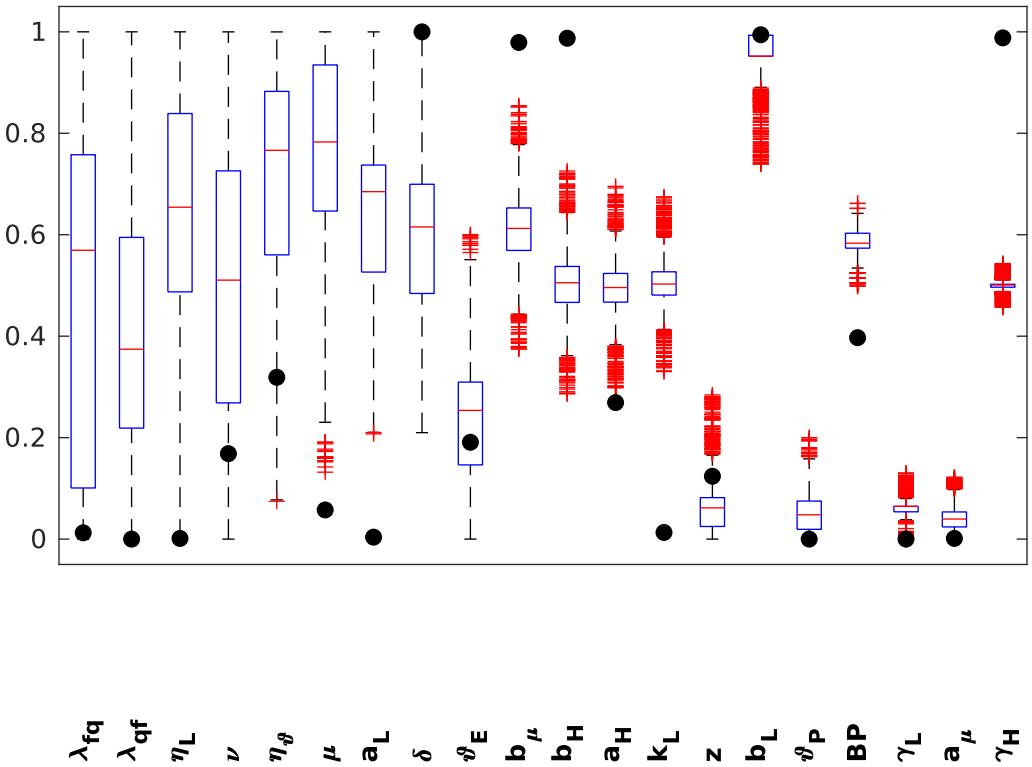
The number of estimations needed to perform the validation was1000.

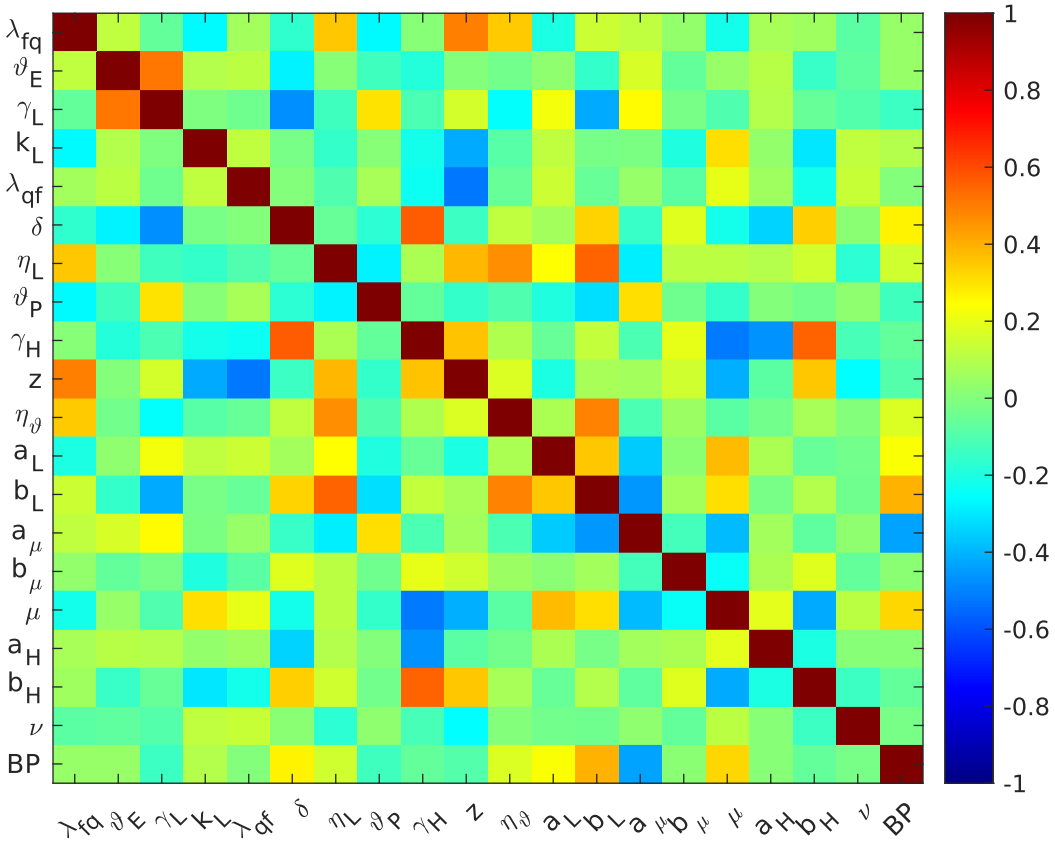
5.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.543'	'0.5956'	'0.5693'	'0.0124'	'0.0903'
\vartheta_E	'0.2397'	'0.2677'	'0.2537'	'0.1909'	'0.0802'
\gamma_L	'0.0481'	'0.081'	'0.0645'	'0'	'0.0966'
k_L	'5.4302'	'5.6202'	'5.5252'	'1.1176'	'0.068'
\lambda_{qf}	'0.3557'	'0.393'	'0.3744'	'0'	'0.0842'
\delta	'0.0903'	'0.0943'	'0.0923'	'0.15'	'0.0995'
\eta_L	'0.635'	'0.6735'	'0.6542'	'0.0013'	'0.1053'
\vartheta_P	'0.0404'	'0.0554'	'0.0479'	'0'	'0.0667'
\gamma_H	'0.49'	'0.5117'	'0.5008'	'0.9881'	'0.1243'
z	'1.2246'	'2.4697'	'1.8471'	'3.7168'	'0.1144'
\eta_\vartheta	'0.7462'	'0.7866'	'0.7664'	'0.319'	'0.08'
a_L	'10.367'	'10.8107'	'10.5888'	'1.0537'	'0.0791'
b_L	'14.0469'	'14.6064'	'14.3267'	'14.9188'	'0.1127'
a_\mu	'1.4595'	'1.6476'	'1.5535'	'1.0191'	'0.0759'
b_\mu	'9.4239'	'9.7244'	'9.5741'	'14.7062'	'0.0595'
\mu	'0.7669'	'0.7988'	'0.7829'	'0.0575'	'0.1125'
a_H	'7.7808'	'8.1048'	'7.9428'	'4.767'	'0.0621'
b_H	'7.9152'	'8.2347'	'8.075'	'14.8236'	'0.0924'
\nu	'244.4782'	'266.051'	'255.2646'	'84.2207'	'0.0654'
BP	'230.0853'	'230.9147'	'230.5'	'211.4998'	'0.0629'

5.3. 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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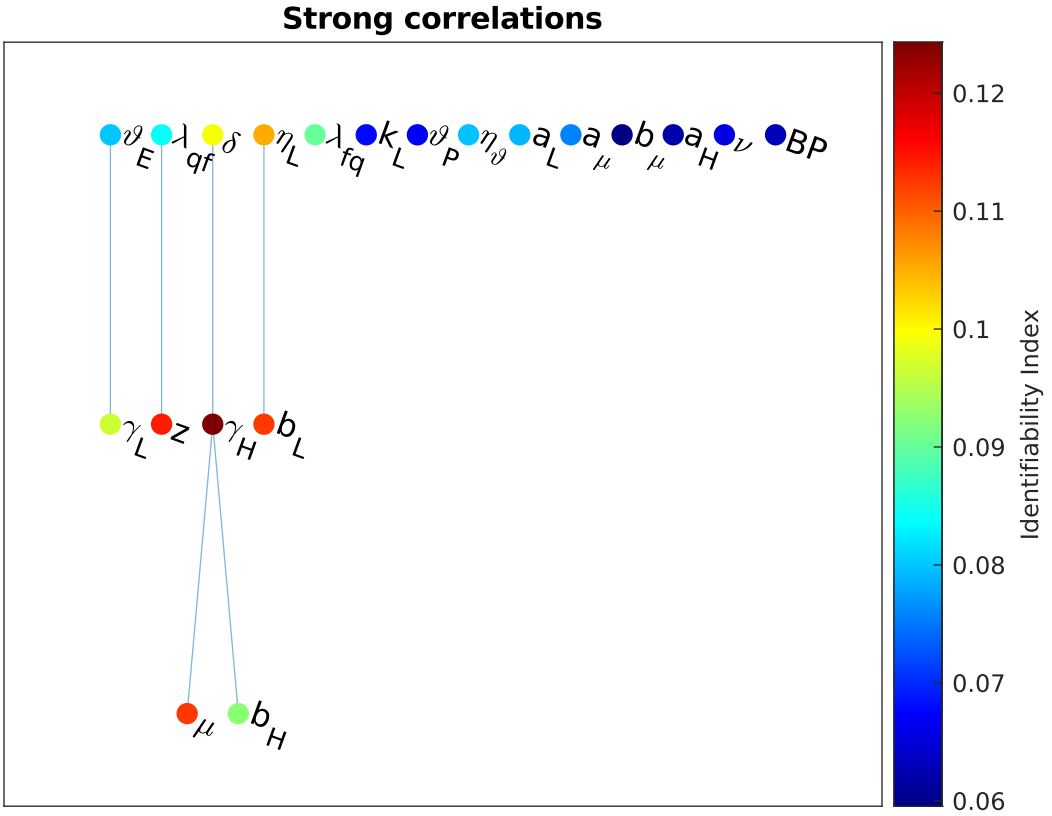
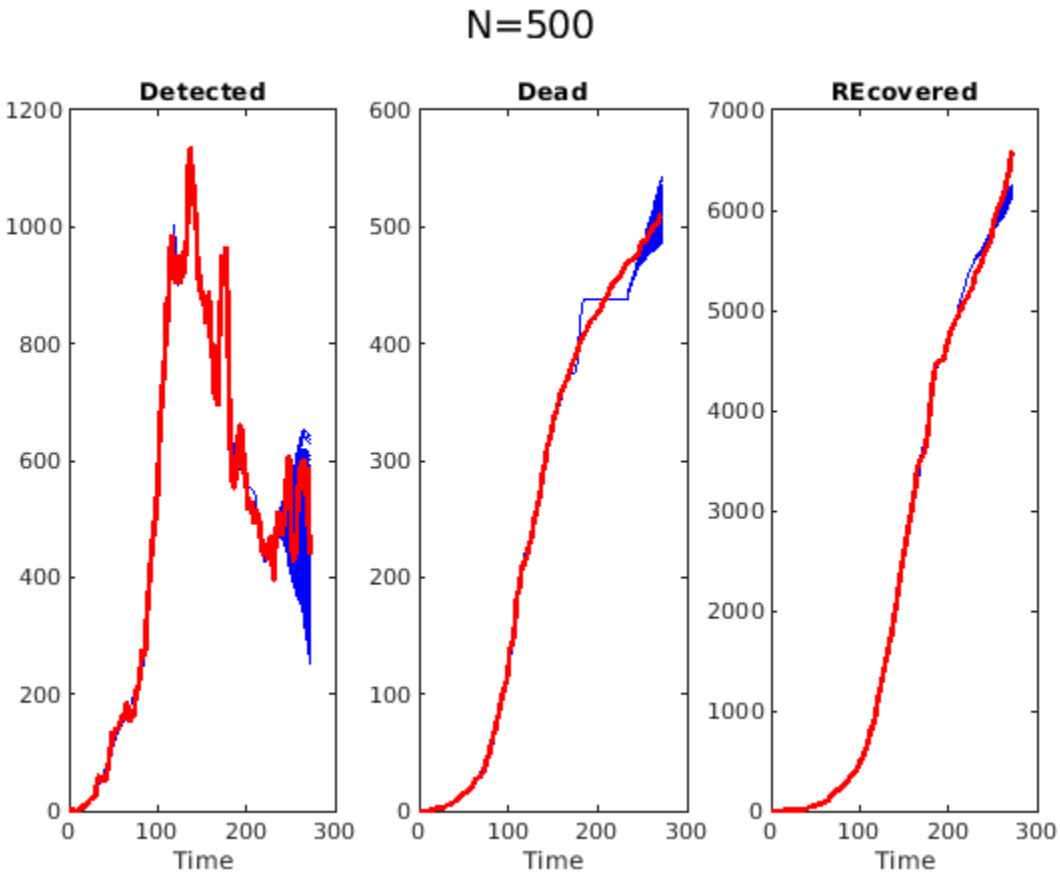
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.12
0.11
0.1
0.09
0.08
0.07
0.06

5.4. Uncertainty analisys



Chapter 6. Extension number6

6.1. Basic information

The extension to be validated consists of the time series from the data273 to the 310. The status of the validation is: COMPLETED.

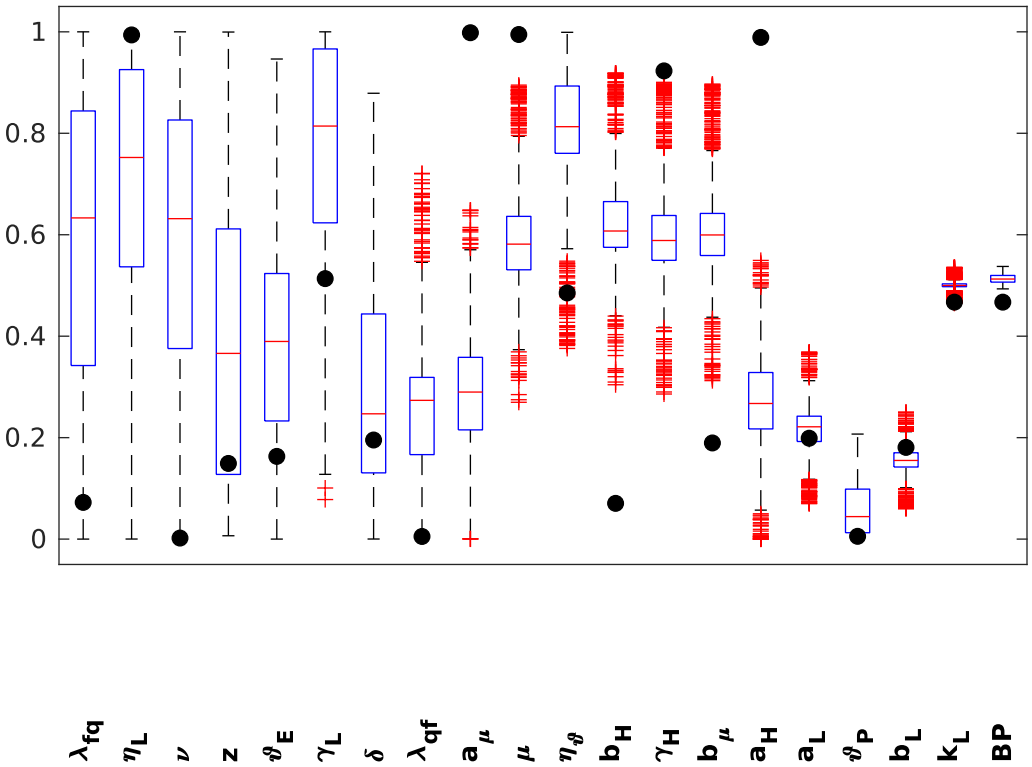
The number of estimations needed to perform the validation was1000.

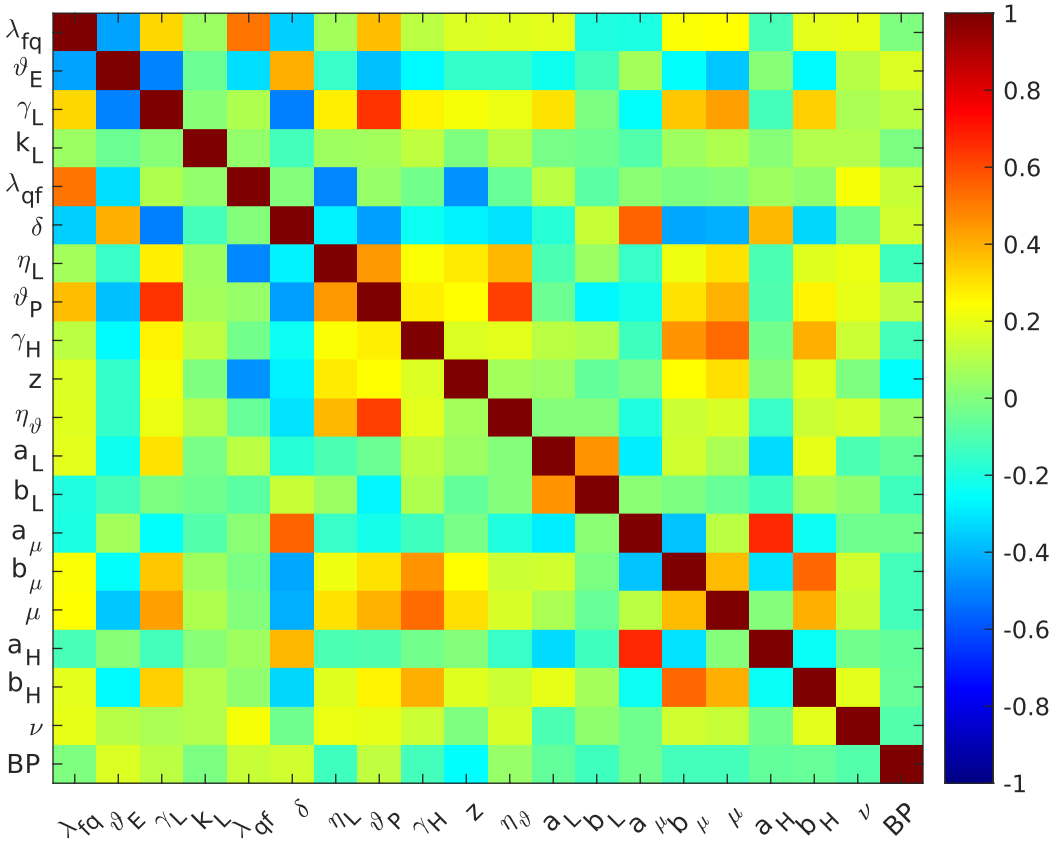
6.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.6072'	'0.6592'	'0.6332'	'0.0724'	'0.1154'
\vartheta_E	'0.3705'	'0.4088'	'0.3896'	'0.1631'	'0.0988'
\gamma_L	'0.7959'	'0.8318'	'0.8138'	'0.5135'	'0.1315'
k_L	'5.4406'	'5.5591'	'5.4998'	'5.2041'	'0.0456'
\lambda_{qf}	'0.2539'	'0.2932'	'0.2735'	'0.0052'	'0.0912'
\delta	'0.0336'	'0.0405'	'0.0371'	'0.0293'	'0.1421'
\eta_L	'0.7303'	'0.7743'	'0.7523'	'0.9939'	'0.0985'
\vartheta_P	'0.0396'	'0.0492'	'0.0444'	'0.0055'	'0.1229'
\gamma_H	'0.5721'	'0.6052'	'0.5886'	'0.923'	'0.1035'
z	'10.2575'	'11.7072'	'10.9823'	'4.4743'	'0.0893'
\eta_\vartheta	'0.7954'	'0.8304'	'0.8129'	'0.4853'	'0.096'
a_L	'3.9718'	'4.227'	'4.0994'	'3.7844'	'0.0715'
b_L	'2.9873'	'3.354'	'3.1707'	'3.5308'	'0.0624'
a_\mu	'4.8464'	'5.2744'	'5.0604'	'14.9752'	'0.1108'
b_\mu	'9.1763'	'9.6117'	'9.394'	'3.6534'	'0.1122'
\mu	'0.565'	'0.5979'	'0.5815'	'0.9947'	'0.1109'
a_H	'4.5304'	'4.9569'	'4.7437'	'14.8459'	'0.0881'
b_H	'9.2873'	'9.7186'	'9.5029'	'1.9863'	'0.1074'
\nu	'304.4536'	'327.2264'	'315.84'	'1.0209'	'0.076'
BP	'272.8892'	'273.0355'	'272.9623'	'269.5'	'0.05'

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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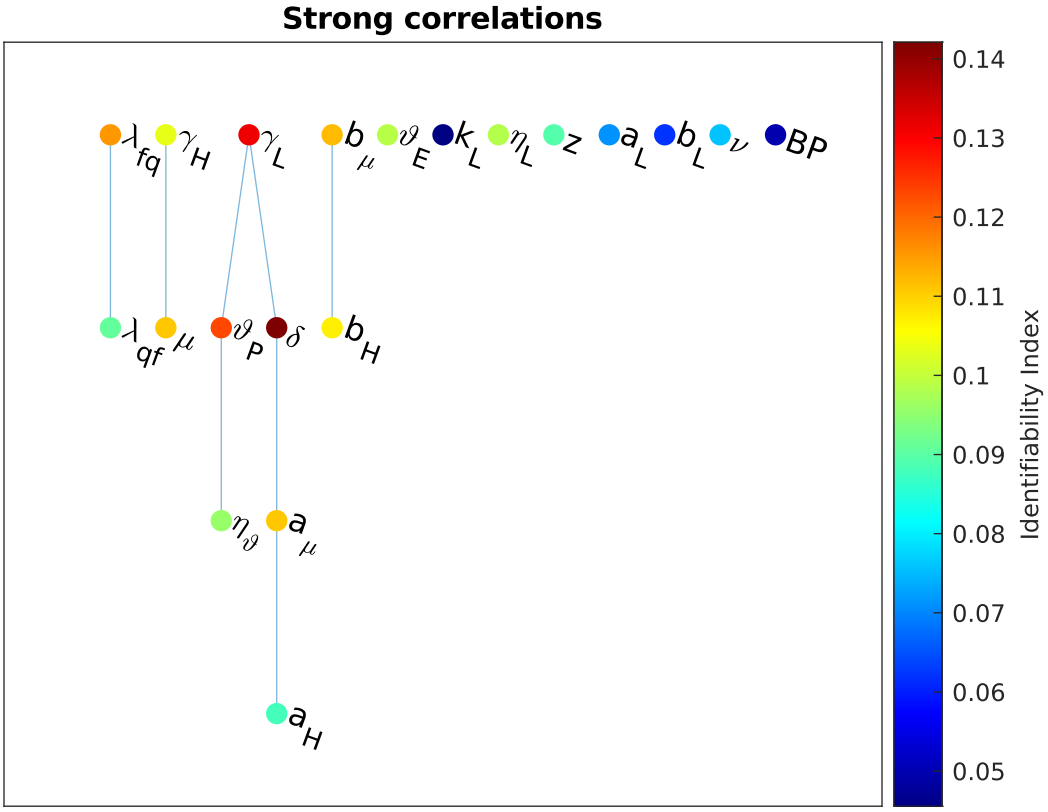
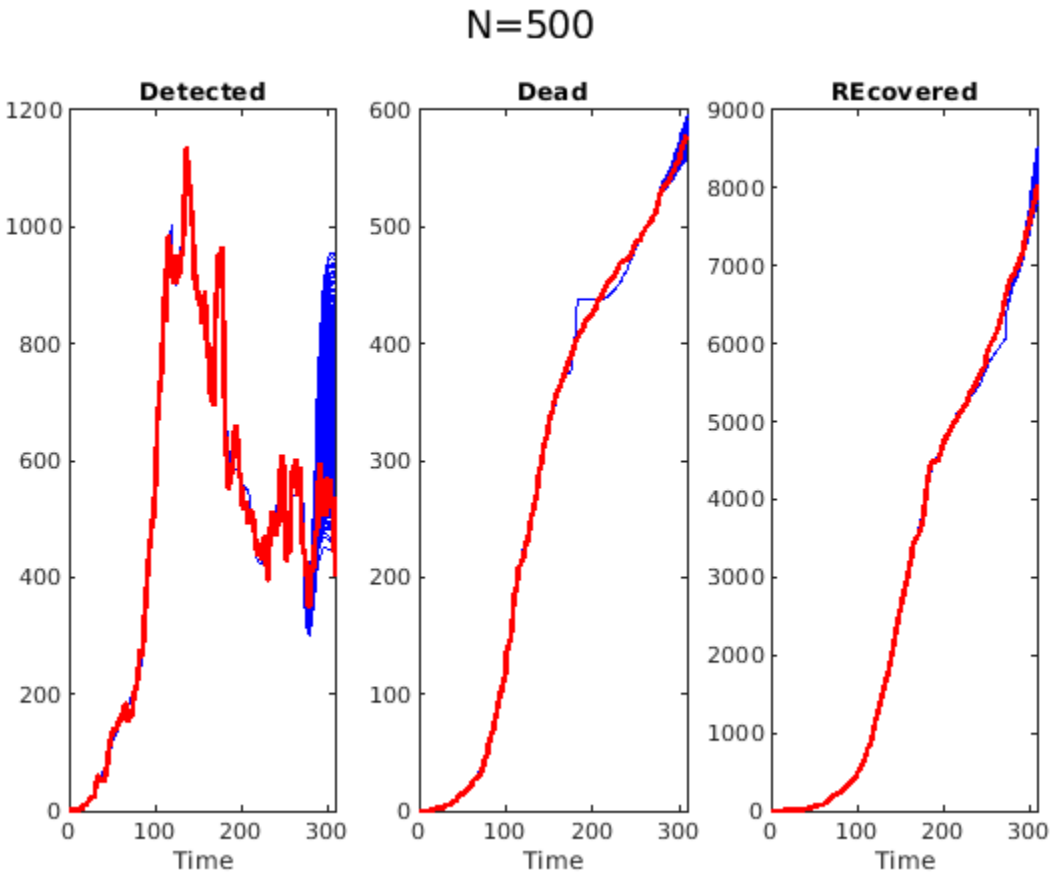
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
γ_H
γ_L
b_μ
ϑ_E
k_L
η_L
z
a_L
b_L
ν
BP
λ_{qf}
μ
ϑ_P
δ
b_H
η_ϑ
a_μ
a_H
0.14
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 data310 to the 337. The status of the validation is: COMPLETED.

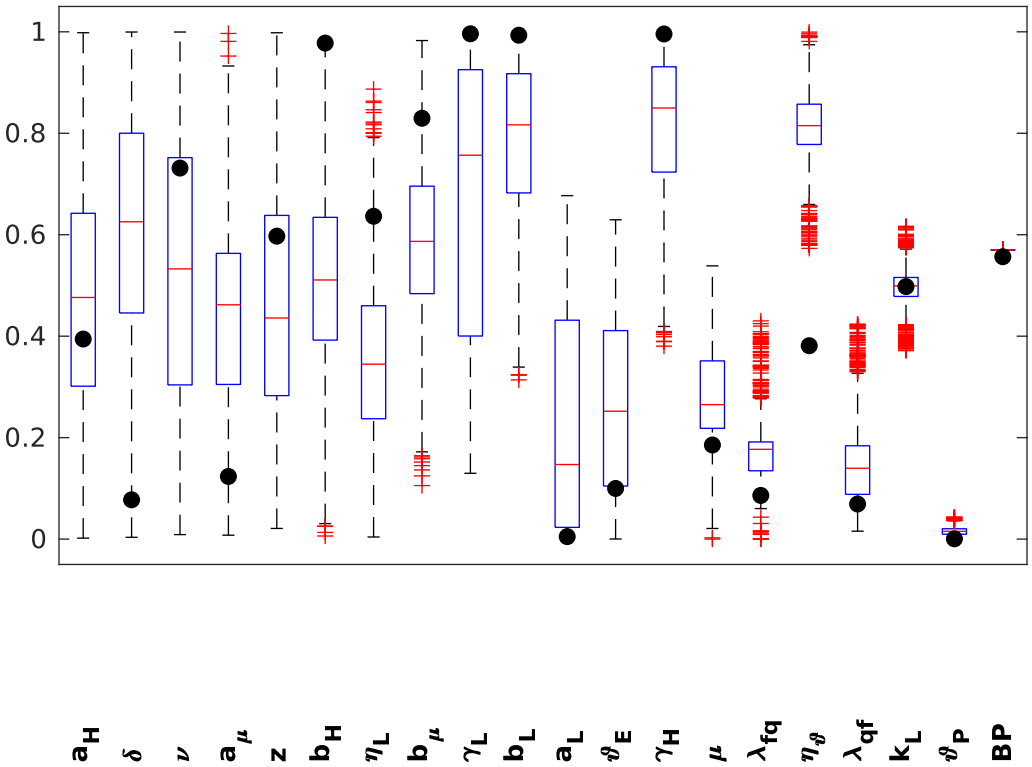
The number of estimations needed to perform the validation was1000.

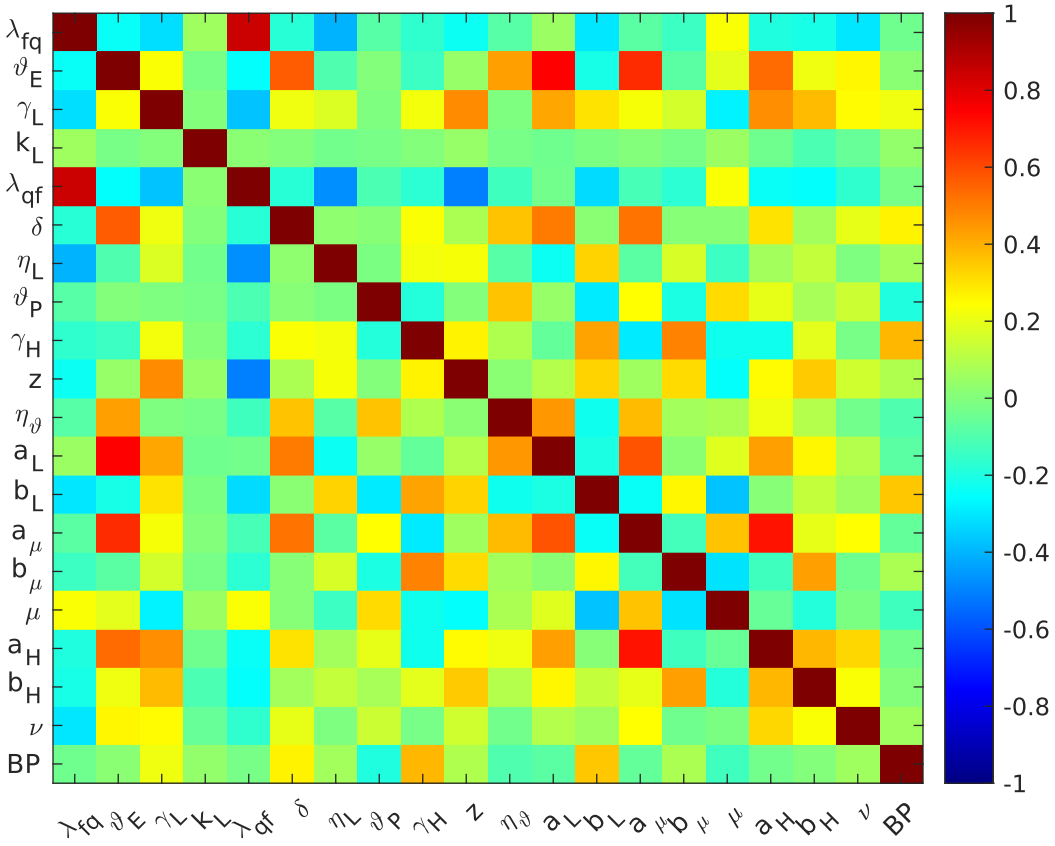
7.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.1566'	'0.1974'	'0.177'	'0.0861'	'0.1097'
\vartheta_E	'0.2364'	'0.2678'	'0.2521'	'0.0998'	'0.1524'
\gamma_L	'0.7312'	'0.7824'	'0.7568'	'0.9961'	'0.1098'
k_L	'5.4207'	'5.565'	'5.4928'	'5.4798'	'0.04'
\lambda_{qf}	'0.1221'	'0.1574'	'0.1397'	'0.0692'	'0.1249'
\delta	'0.0902'	'0.0975'	'0.0938'	'0.0116'	'0.1334'
\eta_L	'0.3248'	'0.3649'	'0.3449'	'0.6364'	'0.0819'
\vartheta_P	'0.0141'	'0.0166'	'0.0153'	'0.0006'	'0.0574'
\gamma_H	'0.8293'	'0.8703'	'0.8498'	'0.9957'	'0.0955'
z	'12.3398'	'13.8097'	'13.0748'	'17.9154'	'0.1094'
\eta_\vartheta	'0.8003'	'0.8297'	'0.815'	'0.3812'	'0.08'
a_L	'2.785'	'3.3315'	'3.0583'	'1.0685'	'0.1383'
b_L	'12.1942'	'12.6711'	'12.4326'	'14.9063'	'0.097'
a_\mu	'7.2006'	'7.732'	'7.4663'	'2.7289'	'0.1584'
b_\mu	'8.9794'	'9.4541'	'9.2168'	'12.6142'	'0.0819'
\mu	'0.2536'	'0.2765'	'0.2651'	'0.1855'	'0.0813'
a_H	'7.3484'	'7.988'	'7.6682'	'6.5209'	'0.1328'
b_H	'7.8603'	'8.443'	'8.1516'	'14.6893'	'0.0944'
\nu	'253.7549'	'278.8807'	'266.3178'	'365.7049'	'0.0832'
BP	'309.4261'	'309.5739'	'309.5'	'308.6257'	'0.0538'

7.3. 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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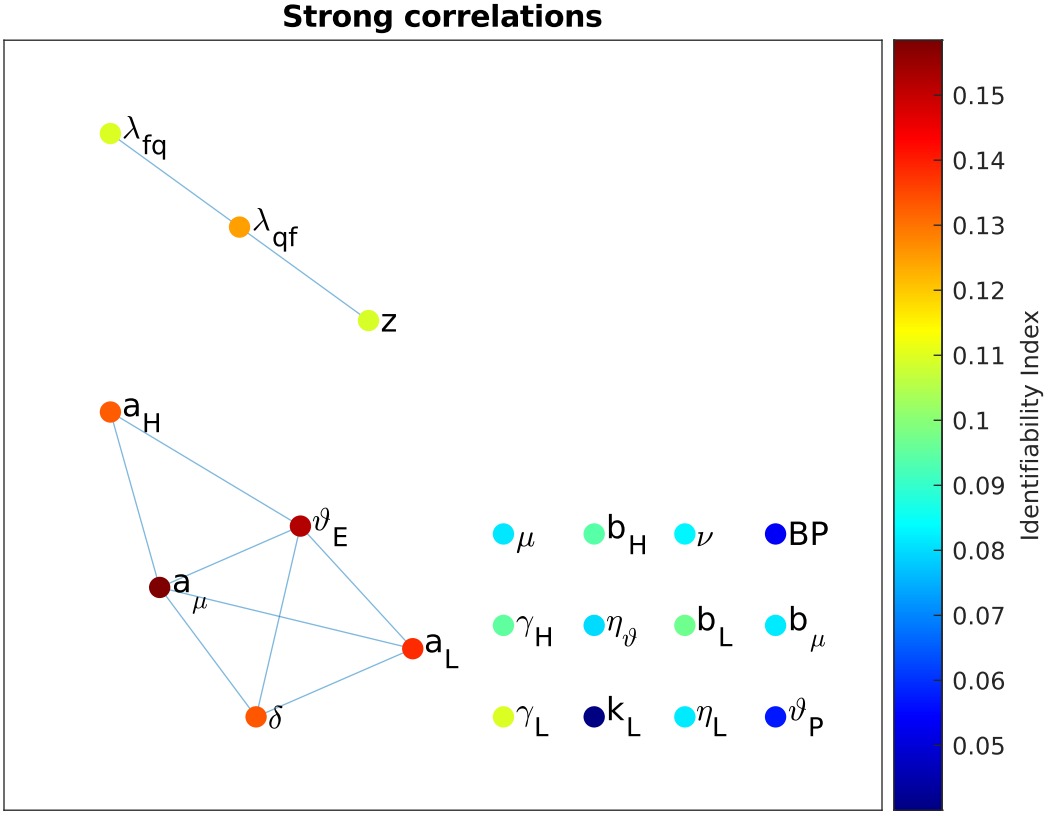
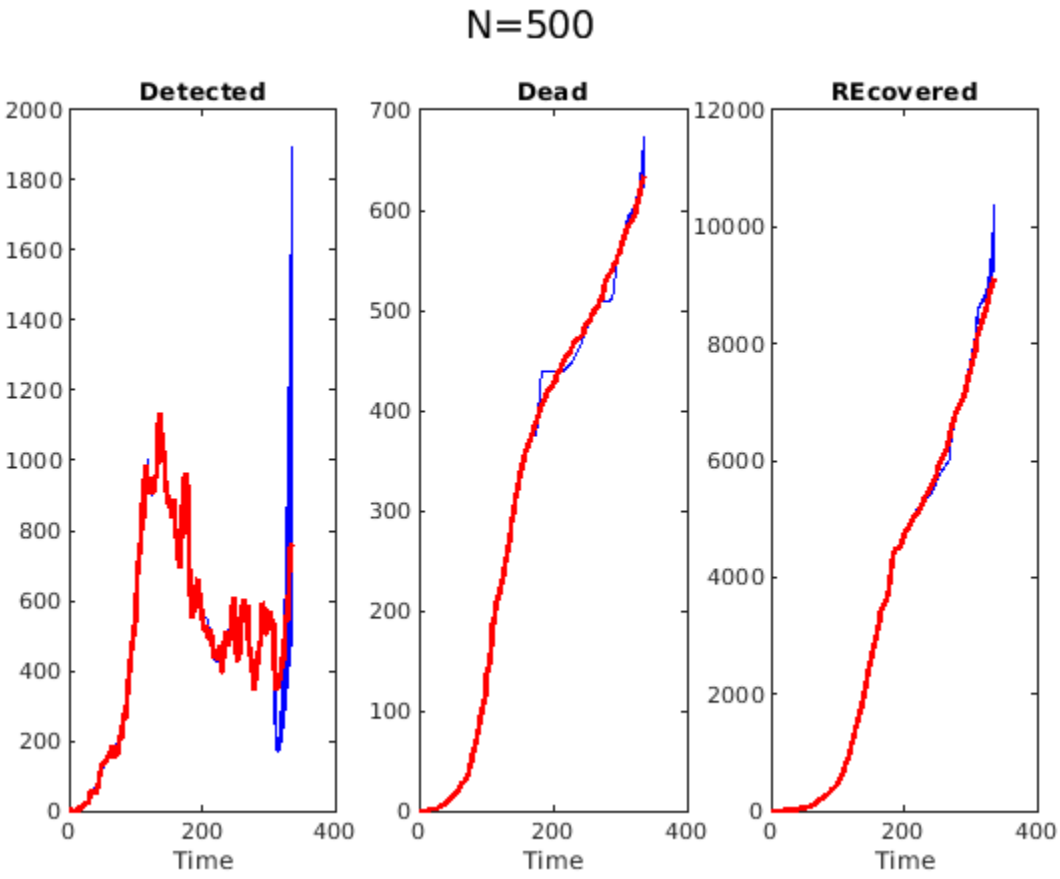
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
λ_{qf}
z
a_H
ϑ_E
a_μ
a_L
δ
μ
b_H
ν
BP
γ_H
η_ϑ
b_L
b_μ
γ_L
k_L
η_L
ϑ_P
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
Identifiability Index

7.4. Uncertainty analisys



Chapter 8. Extension number8

8.1. Basic information

The extension to be validated consists of the time series from the data337 to the 369. The status of the validation is: COMPLETED.

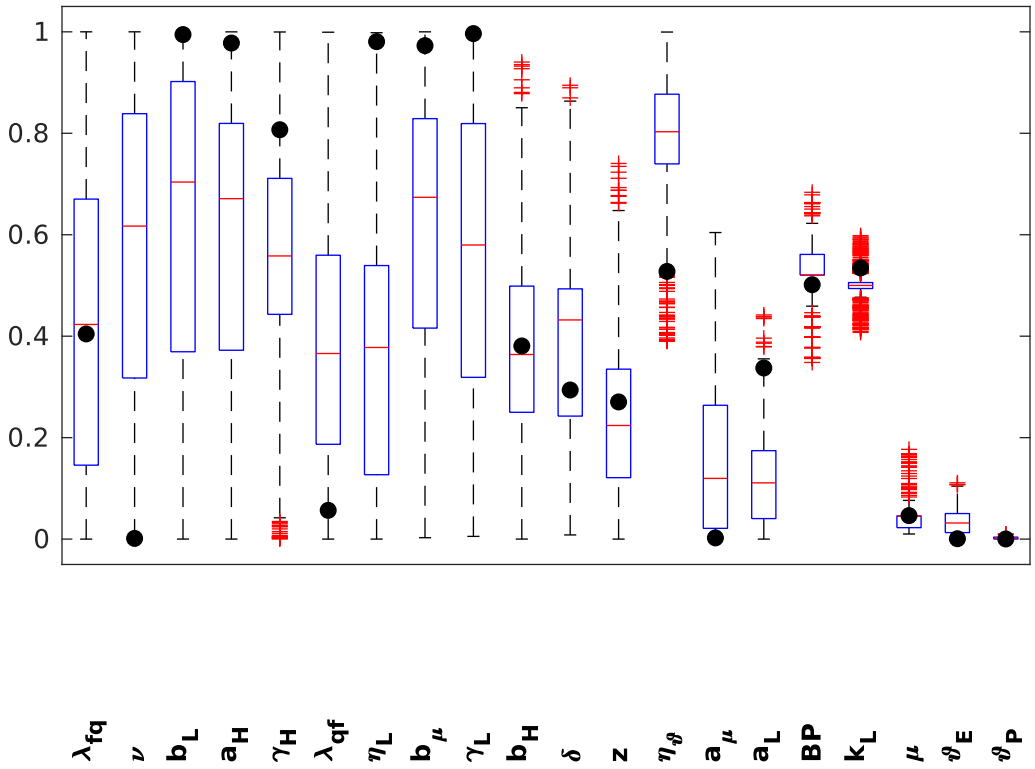
The number of estimations needed to perform the validation was1000.

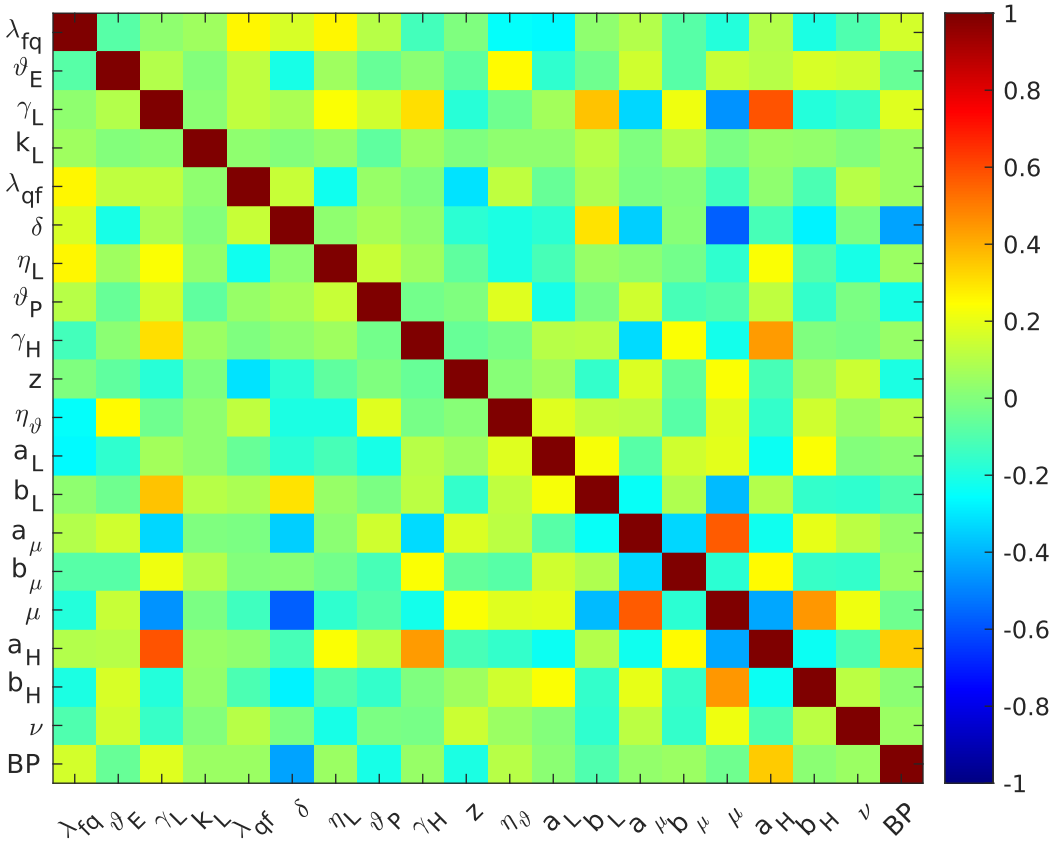
8.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3924'	'0.4539'	'0.4232'	'0.4045'	'0.0875'
\vartheta_E	'0.0288'	'0.0348'	'0.0318'	'0.0007'	'0.0529'
\gamma_L	'0.5498'	'0.6098'	'0.5798'	'0.9965'	'0.1149'
k_L	'5.3923'	'5.6088'	'5.5006'	'5.8116'	'0.0454'
\lambda_{qf}	'0.3404'	'0.3913'	'0.3659'	'0.0567'	'0.0745'
\delta	'0.061'	'0.0686'	'0.0648'	'0.0441'	'0.1044'
\eta_L	'0.3504'	'0.4051'	'0.3777'	'0.9807'	'0.0803'
\vartheta_P	'0.0014'	'0.0022'	'0.0018'	'0.0002'	'0.0492'
\gamma_H	'0.5354'	'0.581'	'0.5582'	'0.807'	'0.0751'
z	'6.1051'	'7.3325'	'6.7188'	'8.1118'	'0.0712'
\eta_\vartheta	'0.7823'	'0.8238'	'0.803'	'0.5277'	'0.0763'
a_L	'2.3354'	'2.7687'	'2.5521'	'5.7224'	'0.0724'
b_L	'10.4301'	'11.2786'	'10.8543'	'14.9242'	'0.0904'
a_\mu	'2.3788'	'2.9718'	'2.6753'	'1.0335'	'0.1026'
b_\mu	'10.0381'	'10.828'	'10.4331'	'14.6192'	'0.0822'
\mu	'0.019'	'0.0723'	'0.0457'	'0.0463'	'0.1369'
a_H	'9.9785'	'10.8137'	'10.3961'	'14.6906'	'0.1166'
b_H	'5.7996'	'6.3896'	'6.0946'	'6.3302'	'0.0831'
\nu	'293.1781'	'323.8485'	'308.5133'	'0.6939'	'0.0788'
BP	'334.8603'	'336.1397'	'335.5'	'334.5736'	'0.0653'

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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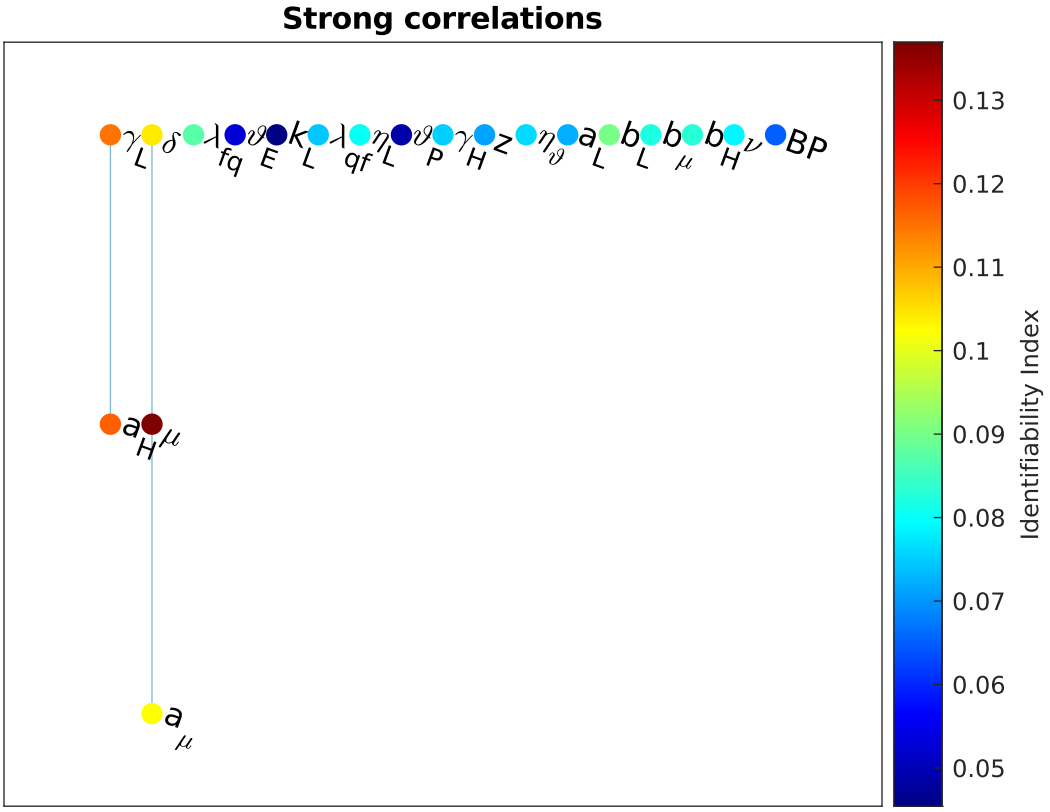
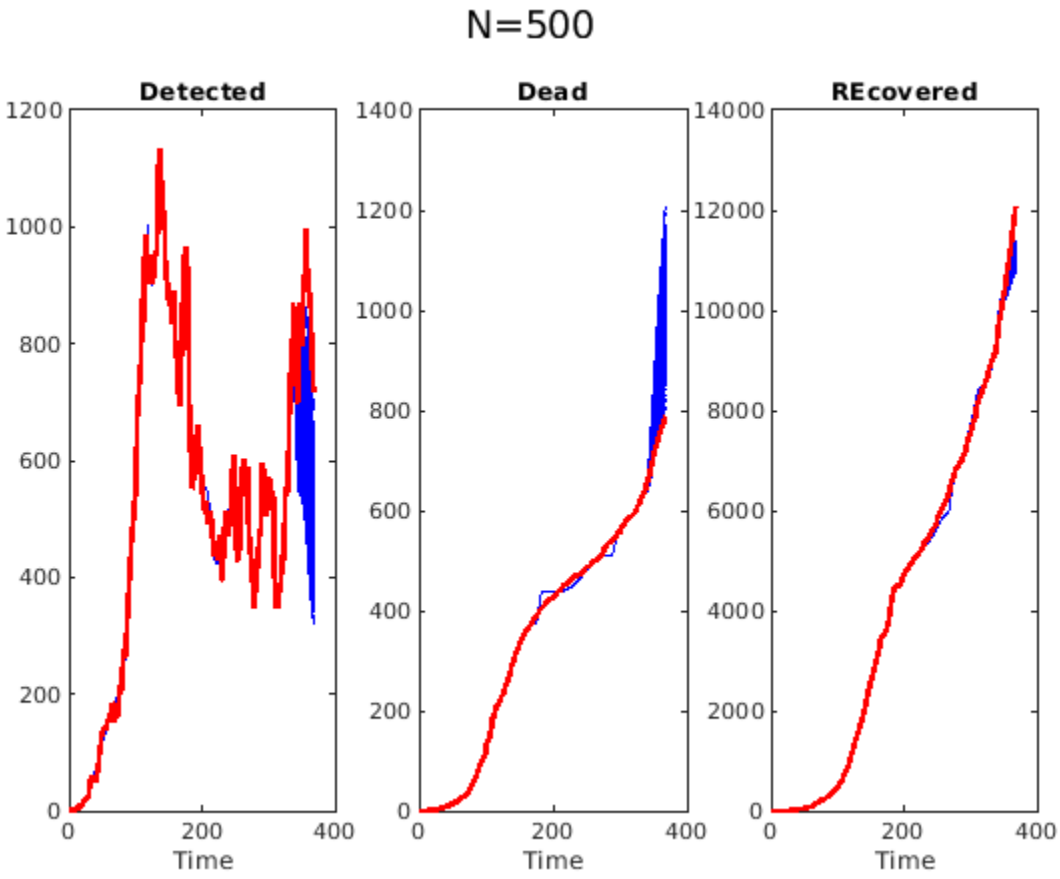
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


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

8.4. Uncertainty analisys



Chapter 9. Extension number9

9.1. Basic information

The extension to be validated consists of the time series from the data369 to the 390. The status of the validation is: COMPLETED.

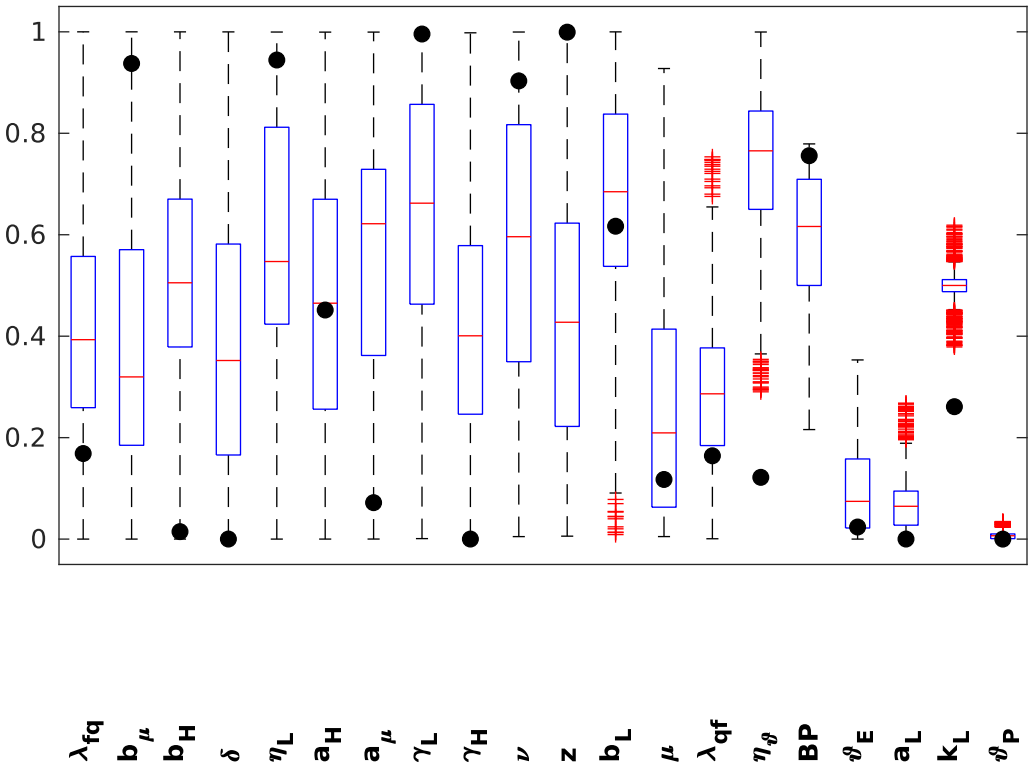
The number of estimations needed to perform the validation was1000.

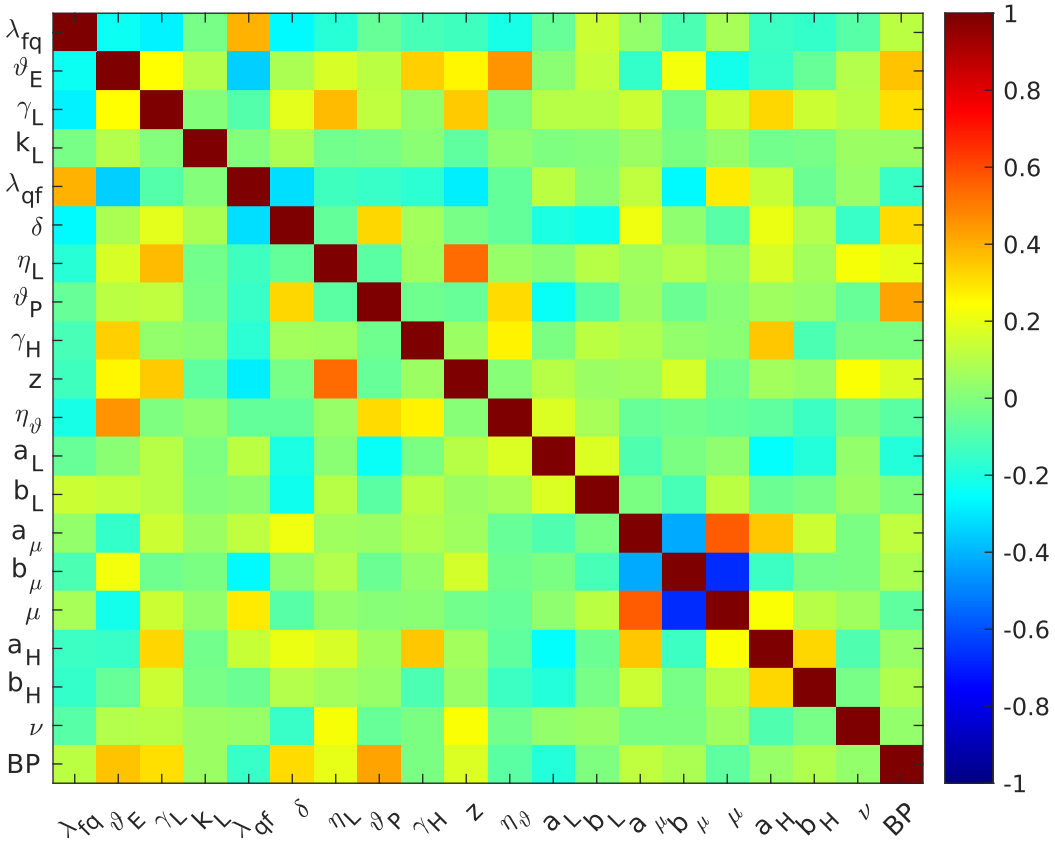
9.2. Estimated parameters with their intervals

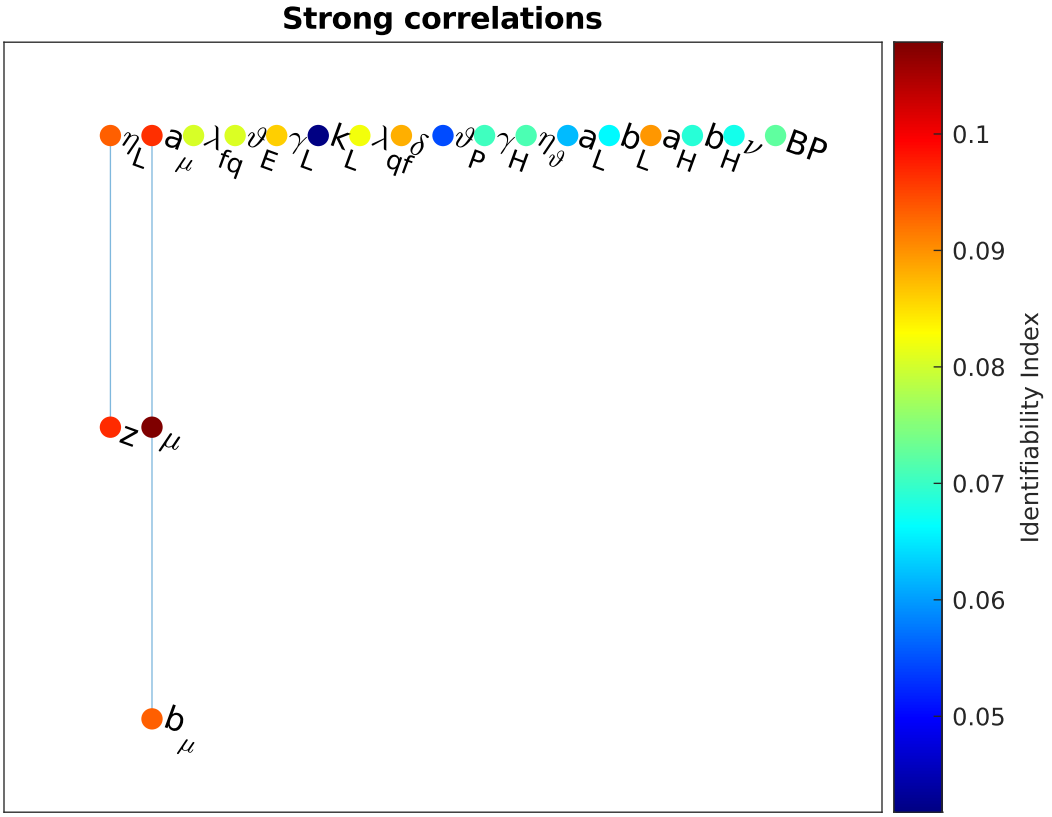
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.372'	'0.4142'	'0.3931'	'0.1687'	'0.0804'
\vartheta_E	'0.0654'	'0.0834'	'0.0744'	'0.0238'	'0.0806'
\gamma_L	'0.64'	'0.6844'	'0.6622'	'0.9957'	'0.086'
k_L	'5.4172'	'5.5829'	'5.5001'	'3.3493'	'0.0418'
\lambda_{qf}	'0.2678'	'0.305'	'0.2864'	'0.1642'	'0.0823'
\delta	'0.0489'	'0.0567'	'0.0528'	'0'	'0.0882'
\eta_L	'0.5243'	'0.5701'	'0.5472'	'0.9444'	'0.0932'
\vartheta_P	'0.0049'	'0.0083'	'0.0066'	'0'	'0.0548'
\gamma_H	'0.3791'	'0.4224'	'0.4008'	'0.0001'	'0.0706'
z	'12.0588'	'13.5909'	'12.8249'	'29.9804'	'0.0967'
\eta_\vartheta	'0.7458'	'0.7849'	'0.7654'	'0.1217'	'0.0713'
a_L	'1.7348'	'2.0767'	'1.9058'	'1.0014'	'0.0621'
b_L	'10.2759'	'10.8826'	'10.5792'	'9.6348'	'0.0662'
a_\mu	'9.3621'	'10.0453'	'9.7037'	'2.0056'	'0.0963'
b_\mu	'5.1297'	'5.8228'	'5.4762'	'14.1267'	'0.0933'
\mu	'0.187'	'0.2326'	'0.2098'	'0.1176'	'0.1079'
a_H	'7.1593'	'7.8619'	'7.5106'	'7.3222'	'0.0897'
b_H	'7.775'	'8.3728'	'8.0739'	'1.2058'	'0.069'
\nu	'285.3027'	'310.7917'	'298.0472'	'451.6161'	'0.0678'
BP	'362.9506'	'364.0494'	'363.5'	'369.5'	'0.0726'

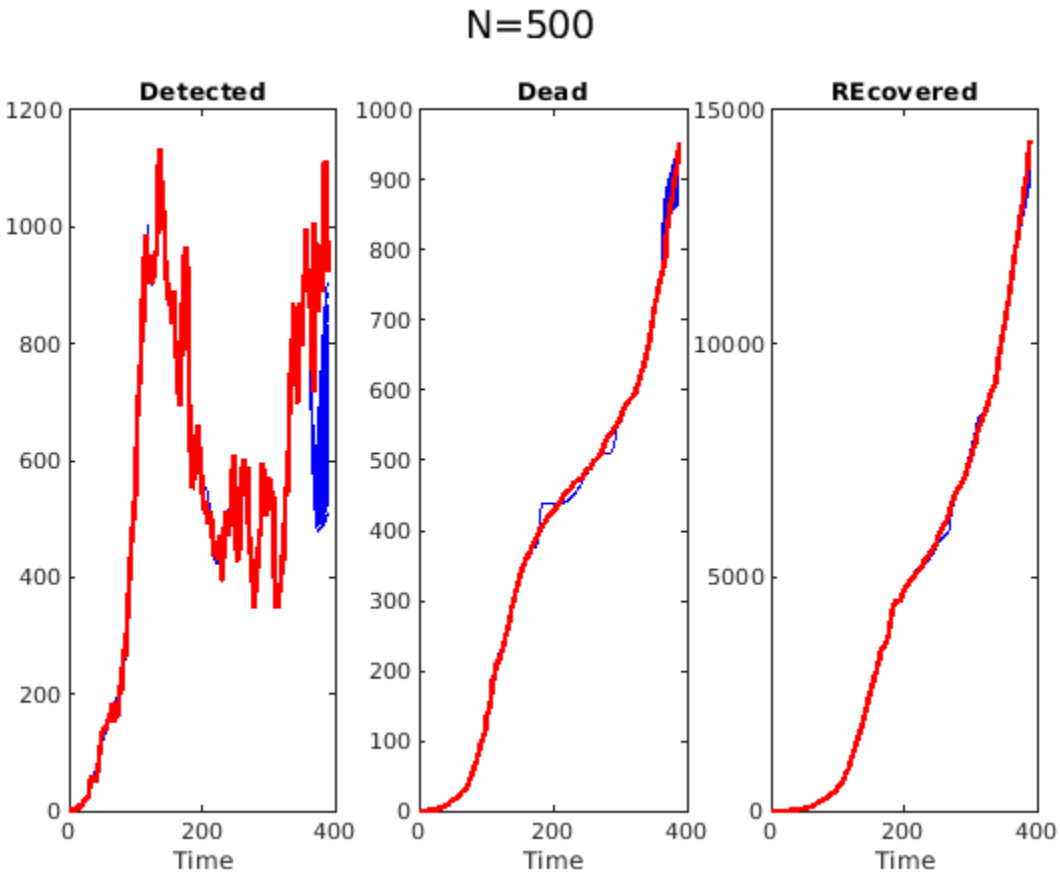
9.3. Identifiability analisys




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
Identifiability Index
0.1
0.09
0.08
0.07
0.06
0.05

9.4. Uncertainty analisys



Chapter 10. Extension number10

10.1. Basic information

The extension to be validated consists of the time series from the data390 to the 420. The status of the validation is: COMPLETED.

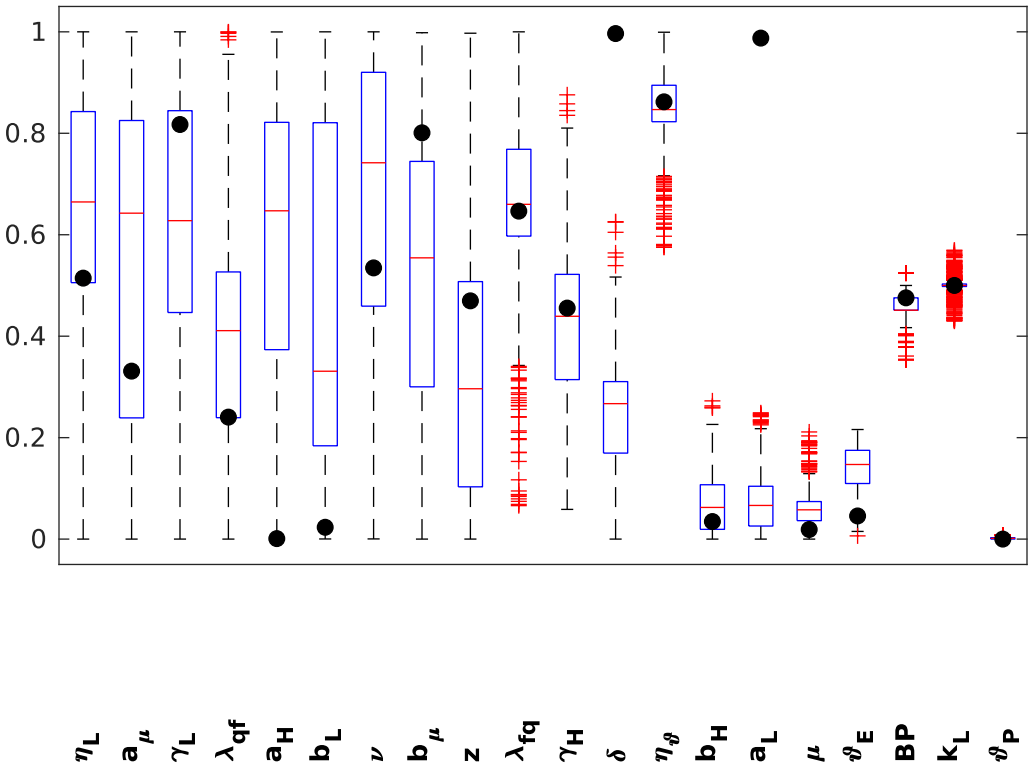
The number of estimations needed to perform the validation was1000.

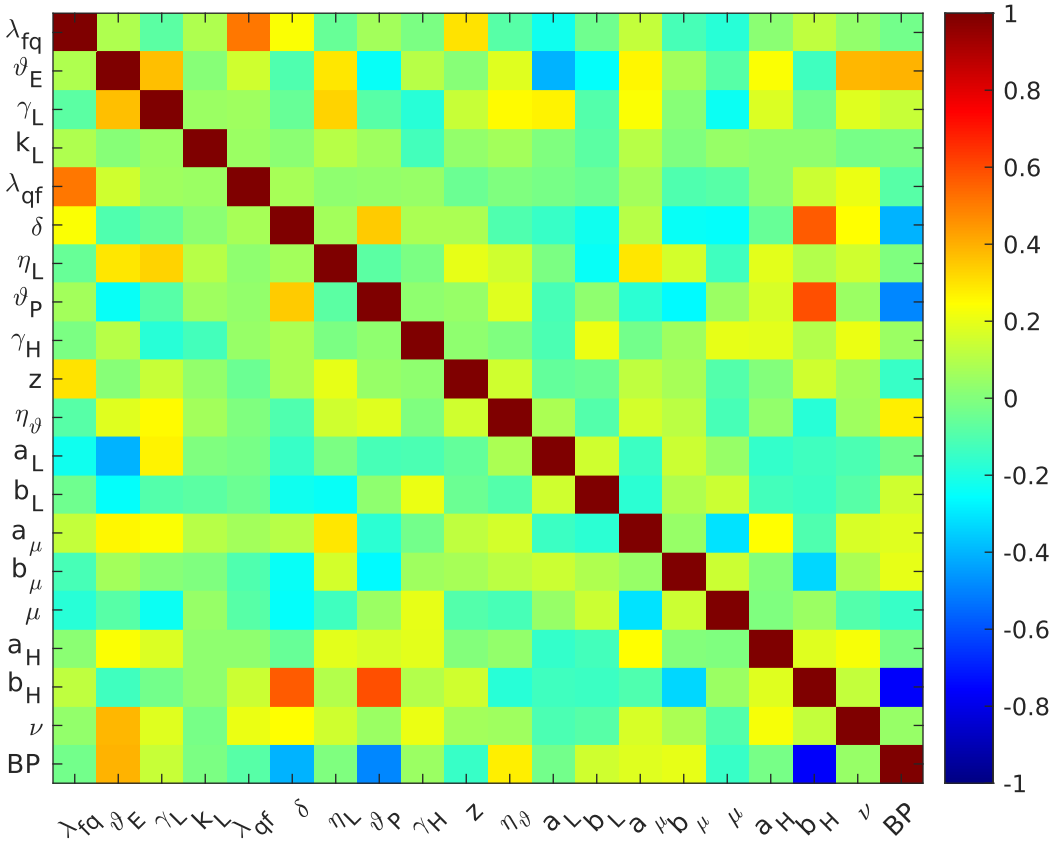
10.2. Estimated parameters with their intervals

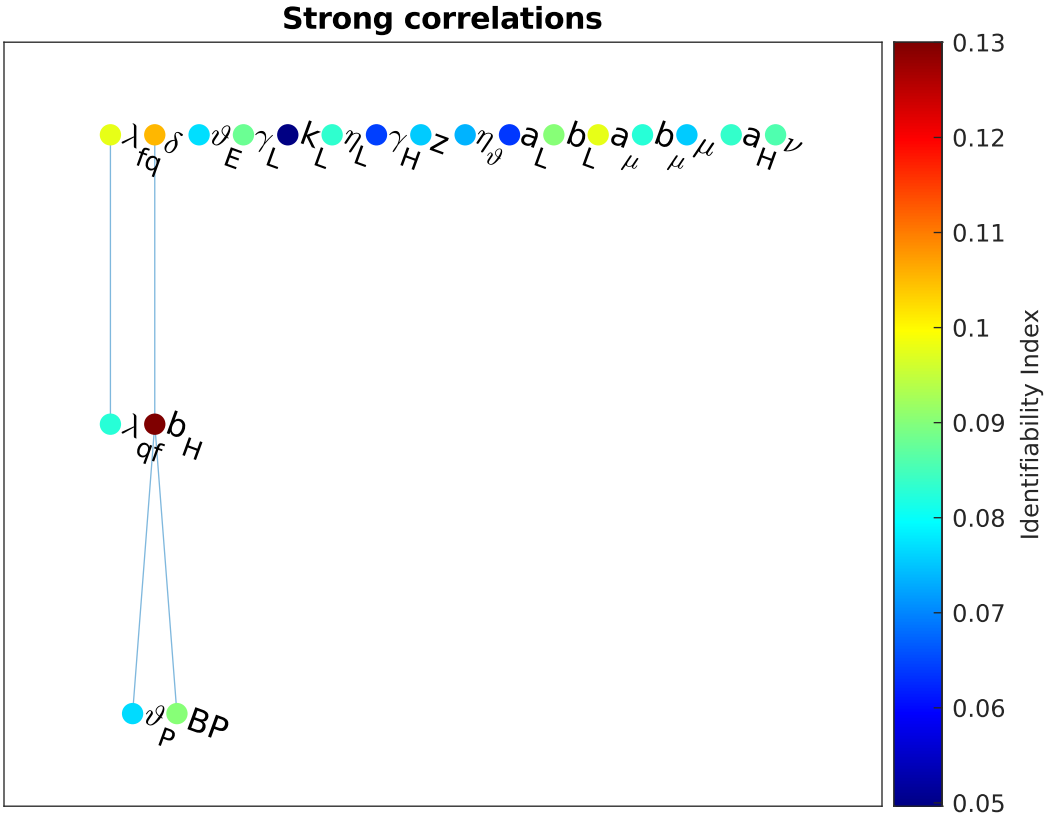
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.6297'	'0.6902'	'0.6599'	'0.6465'	'0.0977'
\vartheta_E	'0.1417'	'0.1524'	'0.1471'	'0.0456'	'0.0772'
\gamma_L	'0.6014'	'0.6541'	'0.6277'	'0.8173'	'0.0882'
k_L	'5.3799'	'5.6203'	'5.5001'	'5.5001'	'0.0497'
\lambda_{qf}	'0.388'	'0.4339'	'0.4109'	'0.2405'	'0.0826'
\delta	'0.0362'	'0.0439'	'0.0401'	'0.1495'	'0.1055'
\eta_L	'0.6384'	'0.6909'	'0.6646'	'0.5145'	'0.0834'
\vartheta_P	'0.0004'	'0.0026'	'0.0015'	'0'	'0.077'
\gamma_H	'0.4218'	'0.4567'	'0.4393'	'0.4554'	'0.0645'
z	'8.0506'	'9.732'	'8.8913'	'14.0905'	'0.0755'
\eta_\vartheta	'0.8267'	'0.8668'	'0.8467'	'0.862'	'0.0736'
a_L	'1.7881'	'2.0696'	'1.9289'	'14.8269'	'0.064'
b_L	'5.1334'	'6.1328'	'5.6331'	'1.3261'	'0.0903'
a_\mu	'9.5014'	'10.4888'	'9.9951'	'5.6359'	'0.098'
b_\mu	'8.3449'	'9.1798'	'8.7623'	'12.2128'	'0.0827'
\mu	'0.0369'	'0.0785'	'0.0577'	'0.0189'	'0.0754'
a_H	'9.6063'	'10.5151'	'10.0607'	'1.0135'	'0.0837'
b_H	'1.6165'	'2.1318'	'1.8742'	'1.4845'	'0.13'
\nu	'356.3443'	'385.5252'	'370.9348'	'267.3161'	'0.086'
BP	'387.1463'	'387.8537'	'387.5'	'388.4999'	'0.0904'

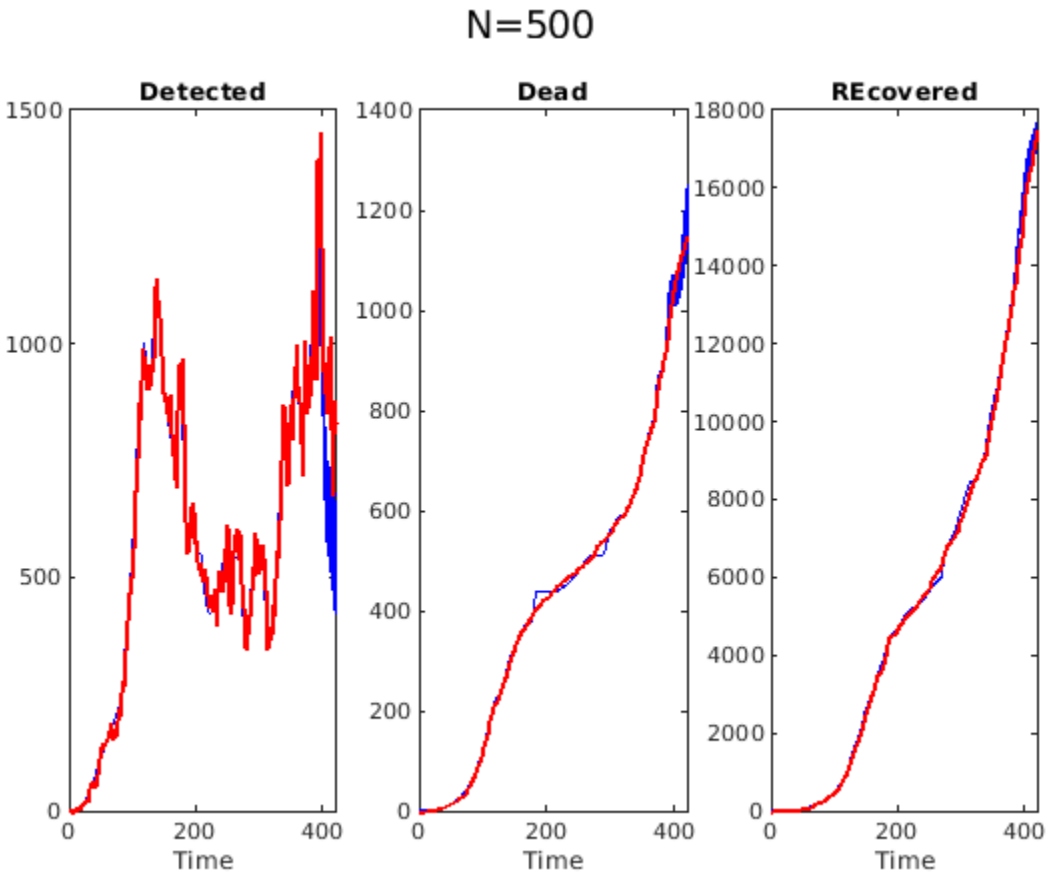
10.3. Identifiability analisys




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
0.13
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 data420 to the 441. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

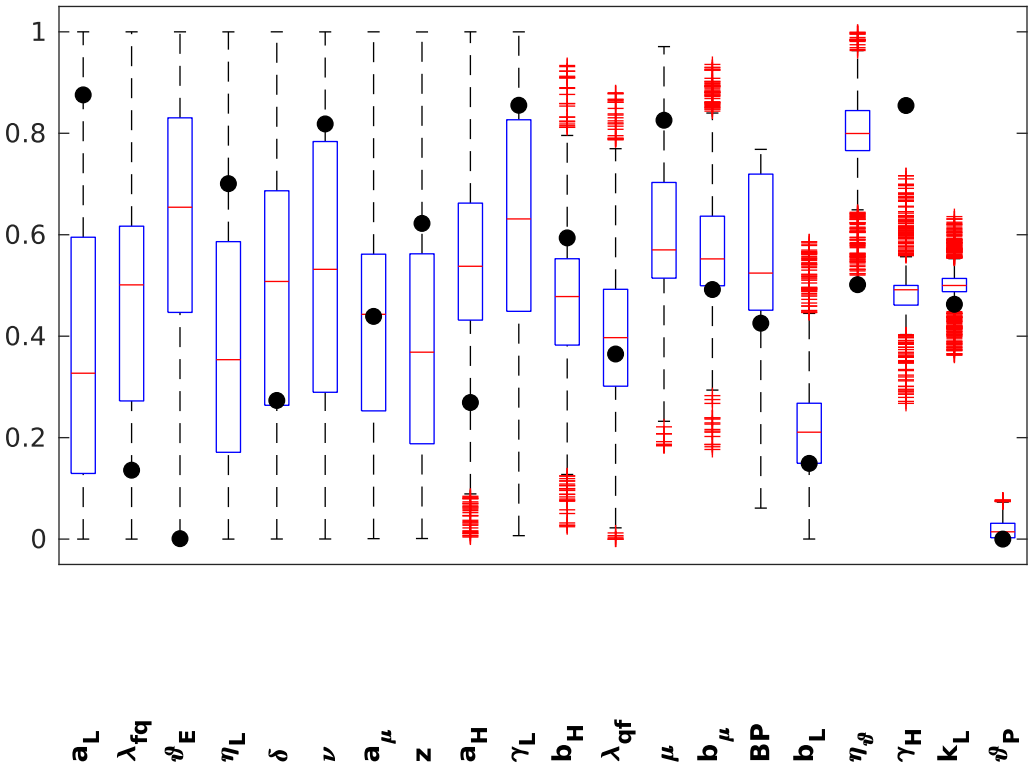
11.2. Estimated parameters with their intervals

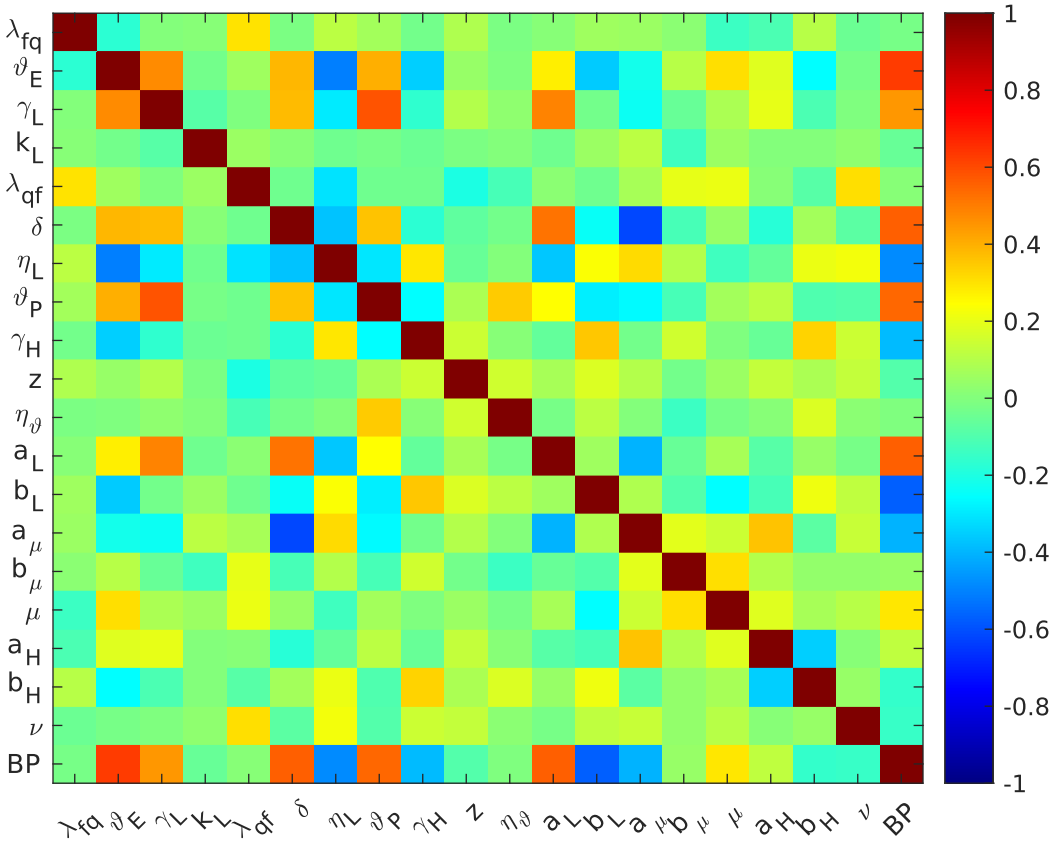
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

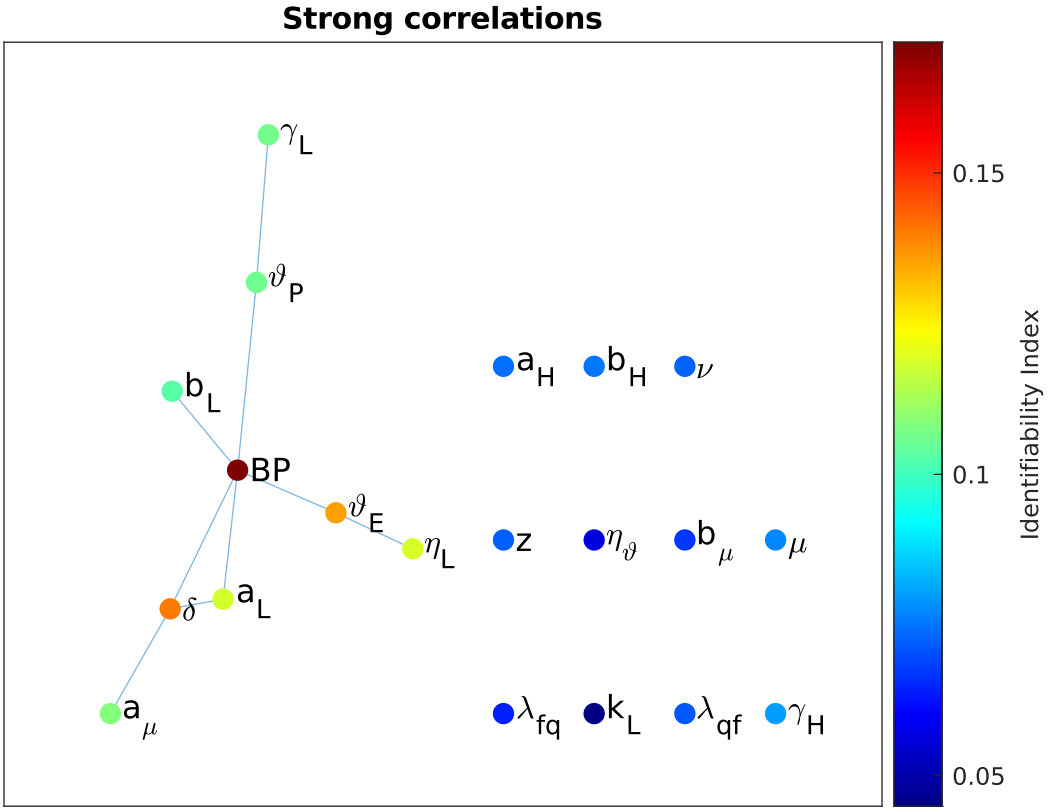
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.1339'	'0.162'	'0.5012'	'0.1358'	'0.0646'
\vartheta_E	'0.0003'	'0.0019'	'0.6542'	'0.0009'	'0.1356'
\gamma_L	'0.093'	'0.945'	'0.6312'	'0.8552'	'0.1065'
k_L	'1.6363'	'8.3418'	'5.4996'	'5.166'	'0.0449'
\lambda_{qf}	'0.328'	'0.3893'	'0.3971'	'0.3649'	'0.0712'
\delta	'0.0362'	'0.047'	'0.0762'	'0.041'	'0.1405'
\eta_L	'0.5254'	'0.8997'	'0.3537'	'0.7007'	'0.1188'
\vartheta_P	'0'	'0'	'0.0144'	'0'	'0.1062'
\gamma_H	'0.3731'	'0.9133'	'0.4915'	'0.8547'	'0.0801'
z	'11.4517'	'19.4876'	'11.0543'	'18.6704'	'0.0722'
\eta_\vartheta	'0.4968'	'0.7151'	'0.7996'	'0.5016'	'0.0564'
a_L	'4.5131'	'13.9634'	'5.5782'	'13.26'	'0.1185'
b_L	'1.35'	'14.454'	'3.9506'	'3.0898'	'0.1031'
a_\mu	'6.5379'	'12.5011'	'7.2037'	'7.1465'	'0.1085'
b_\mu	'1'	'9.2435'	'8.7331'	'7.8877'	'0.0676'
\mu	'0.1664'	'0.9021'	'0.5701'	'0.8257'	'0.0774'
a_H	'4.7552'	'6.403'	'8.5296'	'4.7696'	'0.0745'
b_H	'6.7356'	'10.832'	'7.6938'	'9.3131'	'0.0756'
\nu	'353.8871'	'436.3717'	'265.9018'	'409.2233'	'0.0729'
BP	'404.4487'	'408.3668'	'411.5'	'407.4517'	'0.1717'

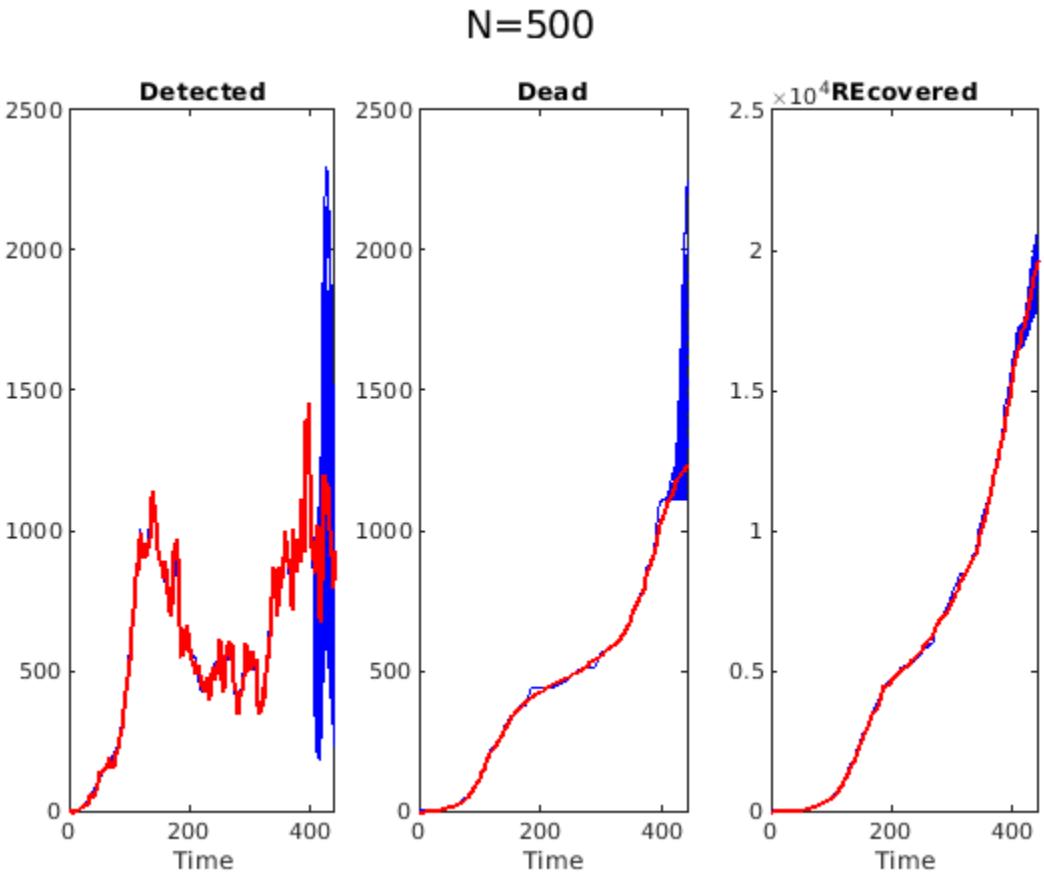
11.3. Identifiability analisys




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
γ_L
ϑ_P
b_L
BP
ϑ_E
η_L
δ
a_L
a_μ
a_H
b_H
ν
z
η_ϑ
b_μ
μ
λ_{fq}
k_L
λ_{qf}
γ_H
0.15
0.1
0.05
Identifiability Index

11.4. Uncertainty analisys



Chapter 12. Extension number12

12.1. Basic information

The extension to be validated consists of the time series from the data441 to the 462. The status of the validation is: COMPLETED.

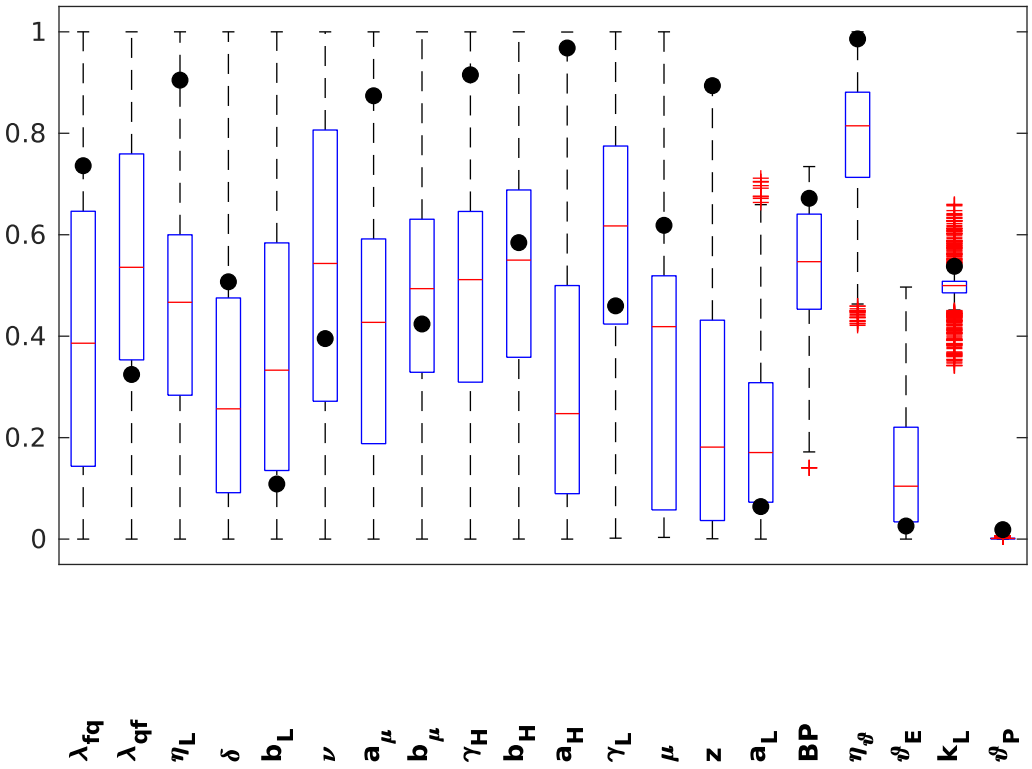
The number of estimations needed to perform the validation was1000.

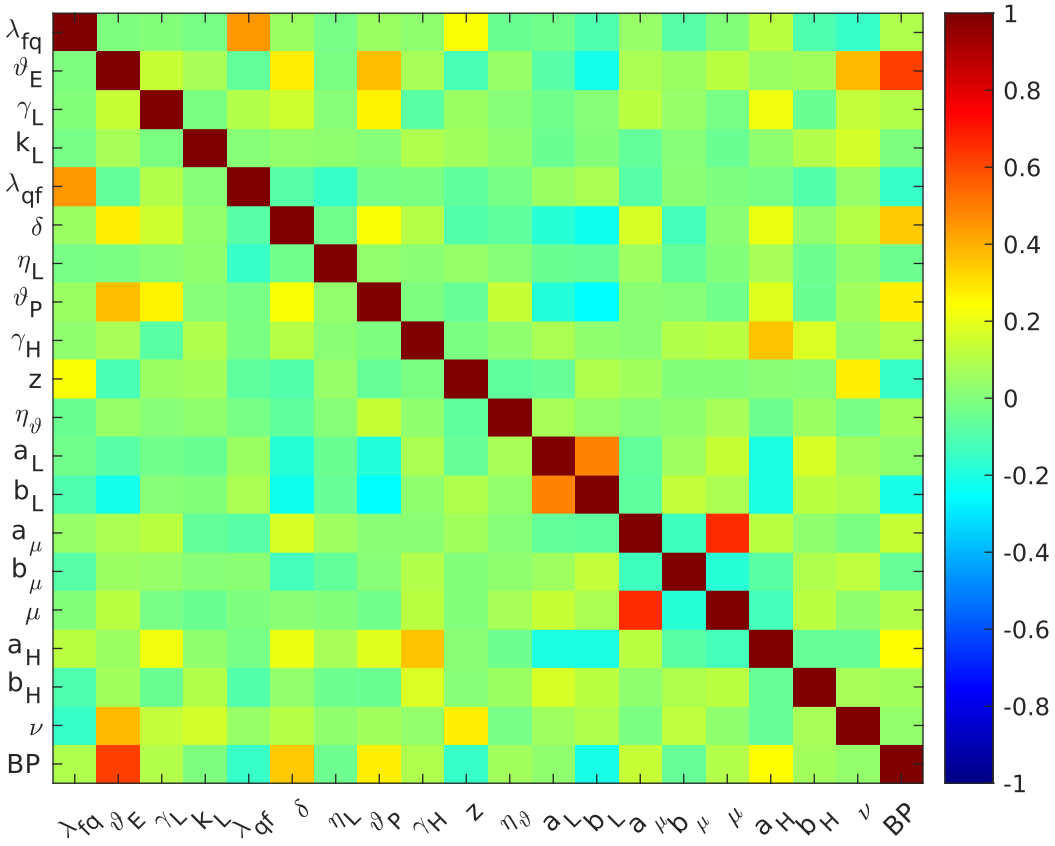
12.2. Estimated parameters with their intervals

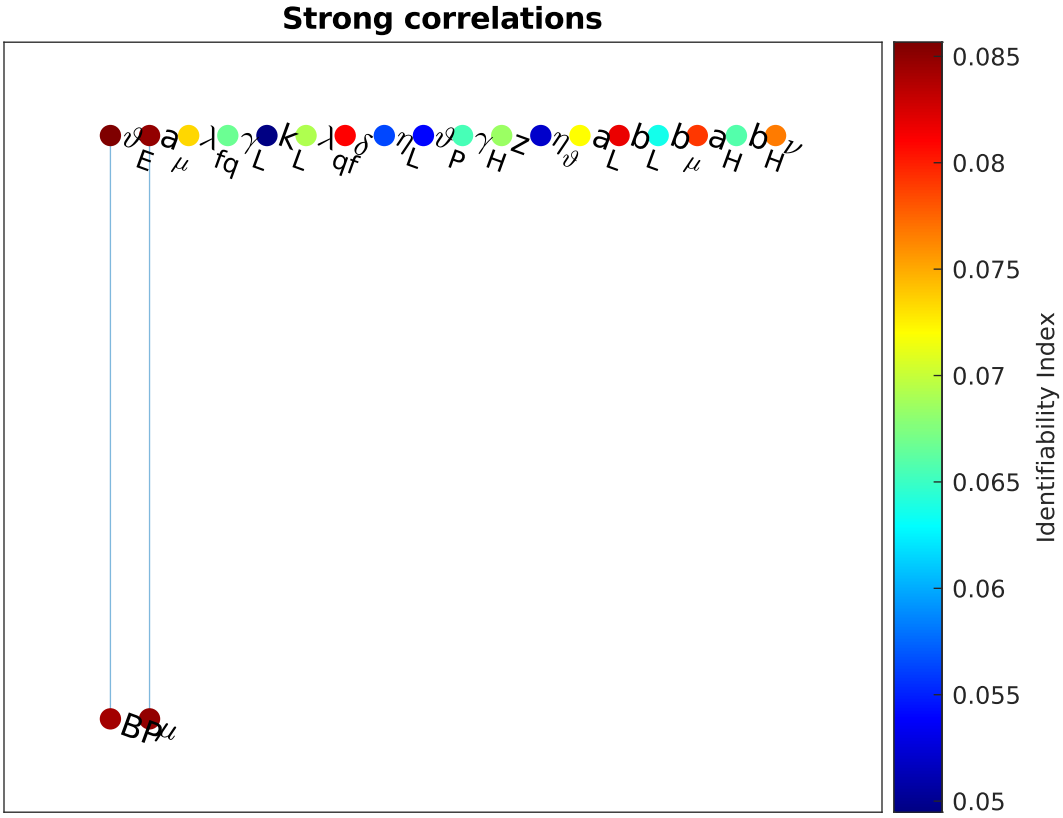
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.358'	'0.4143'	'0.3861'	'0.7361'	'0.0734'
\vartheta_E	'0.0917'	'0.1169'	'0.1043'	'0.0258'	'0.0857'
\gamma_L	'0.5944'	'0.6403'	'0.6174'	'0.4598'	'0.0668'
k_L	'5.3698'	'5.6253'	'5.4975'	'5.8401'	'0.0495'
\lambda_{qf}	'0.5103'	'0.5612'	'0.5358'	'0.3245'	'0.0693'
\delta	'0.0348'	'0.0422'	'0.0385'	'0.0761'	'0.0811'
\eta_L	'0.4444'	'0.4892'	'0.4668'	'0.9048'	'0.0565'
\vartheta_P	'0.0004'	'0.0021'	'0.0012'	'0.0186'	'0.0541'
\gamma_H	'0.489'	'0.534'	'0.5115'	'0.9152'	'0.0655'
z	'4.685'	'6.1961'	'5.4405'	'26.8166'	'0.0685'
\eta_\vartheta	'0.7984'	'0.8311'	'0.8147'	'0.9861'	'0.0521'
a_L	'3.0906'	'3.6867'	'3.3887'	'1.8972'	'0.072'
b_L	'5.2997'	'6.0244'	'5.662'	'2.5211'	'0.0818'
a_\mu	'6.6552'	'7.3081'	'6.9816'	'13.2353'	'0.0849'
b_\mu	'7.6078'	'8.2164'	'7.9121'	'6.9368'	'0.0637'
\mu	'0.3945'	'0.4432'	'0.4188'	'0.6186'	'0.0848'
a_H	'4.1183'	'4.8079'	'4.4631'	'14.5537'	'0.0791'
b_H	'8.3775'	'9.0218'	'8.6997'	'9.1822'	'0.066'
\nu	'257.5105'	'285.8577'	'271.6841'	'197.6351'	'0.0767'
BP	'437.1159'	'437.8841'	'437.5'	'441.4996'	'0.0844'

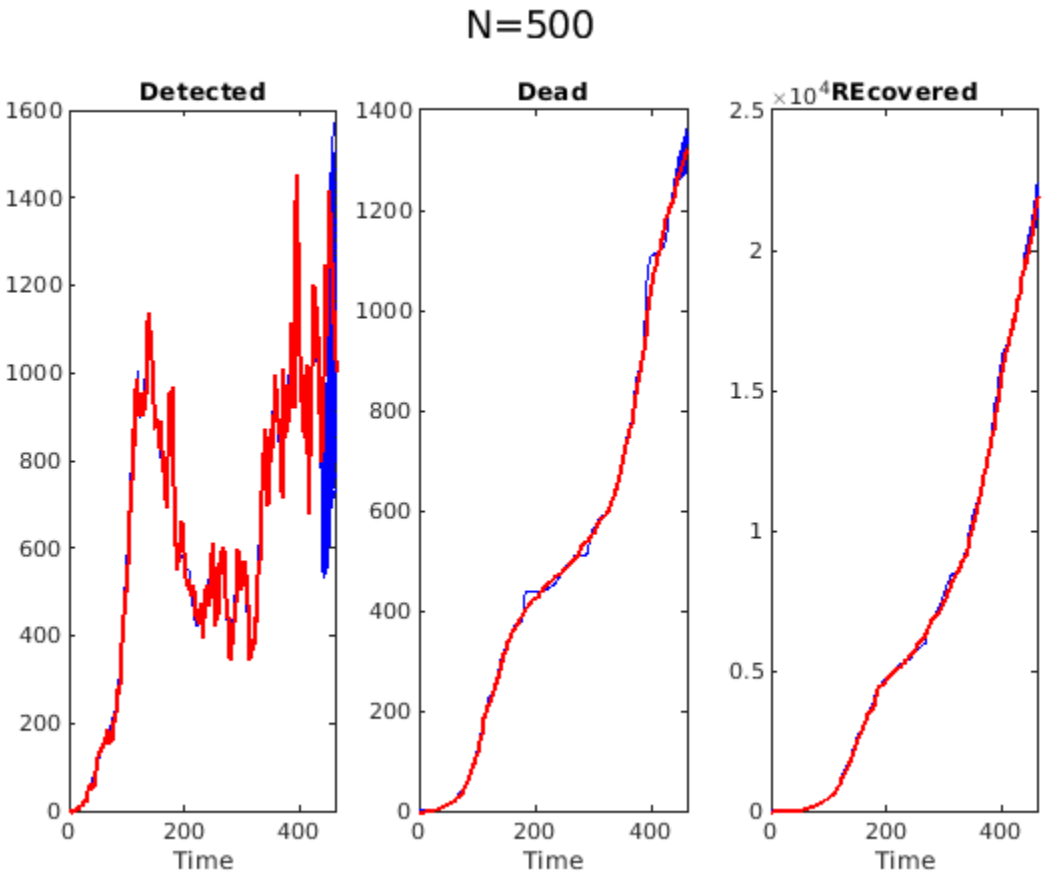
12.3. Identifiability analisys




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
0.085
0.08
0.075
0.07
0.065
0.06
0.055
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 data462 to the 469. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

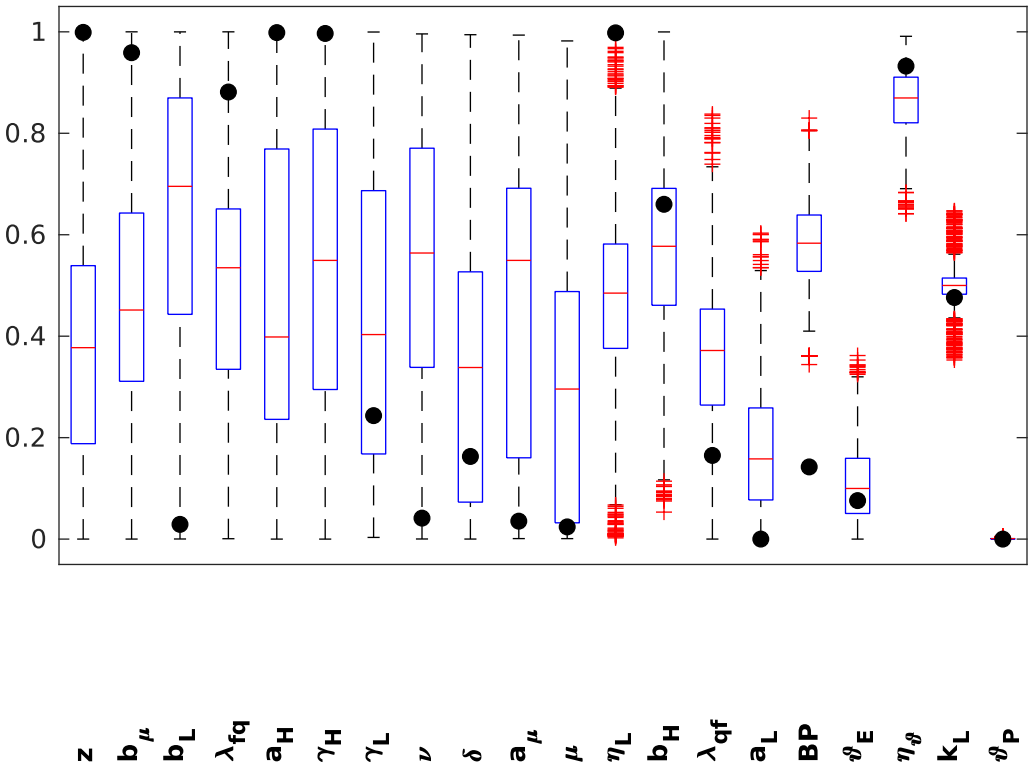
13.2. Estimated parameters with their intervals

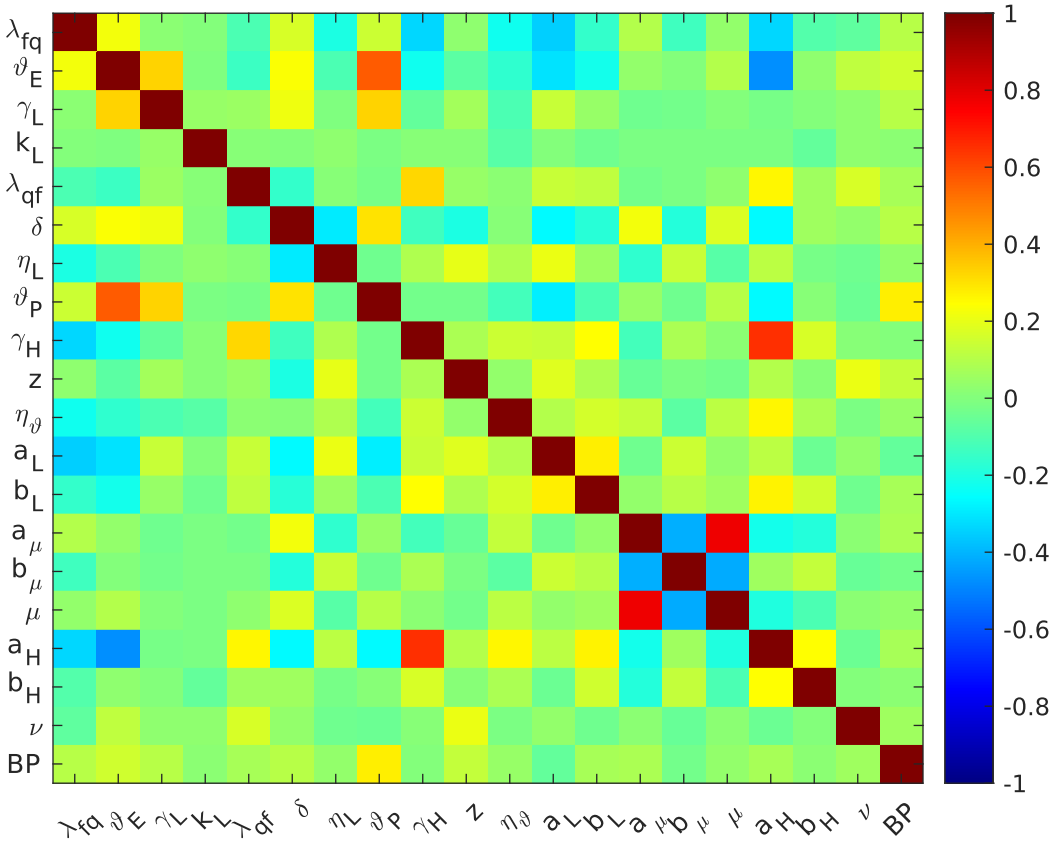
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.7589'	'0.9477'	'0.5349'	'0.8814'	'0.0804'
\vartheta_E	'0.0717'	'0.1369'	'0.0998'	'0.0759'	'0.0902'
\gamma_L	'0.2383'	'0.7654'	'0.4032'	'0.2434'	'0.0704'
k_L	'1.1642'	'9.208'	'5.5'	'5.2863'	'0.04'
\lambda_{qf}	'0.1271'	'0.1857'	'0.3718'	'0.165'	'0.0644'
\delta	'0.0236'	'0.0381'	'0.0507'	'0.0244'	'0.087'
\eta_L	'0.4621'	'1'	'0.4849'	'0.998'	'0.0674'
\vartheta_P	'0'	'0'	'0.001'	'0'	'0.0731'
\gamma_H	'0.4355'	'1'	'0.5494'	'0.9968'	'0.0983'
z	'19.4516'	'30'	'11.3212'	'29.9679'	'0.0661'
\eta_\vartheta	'0.3429'	'0.9448'	'0.8696'	'0.9324'	'0.0609'
a_L	'1'	'1.7413'	'3.2135'	'1.0007'	'0.0792'
b_L	'1.2687'	'7.7855'	'10.7354'	'1.4066'	'0.0799'
a_\mu	'1'	'10.2725'	'8.6917'	'1.4952'	'0.0954'
b_\mu	'3.6096'	'14.4305'	'7.3223'	'14.4239'	'0.071'
\mu	'0'	'0.0455'	'0.2958'	'0.0241'	'0.089'
a_H	'11.976'	'15'	'6.5784'	'14.9786'	'0.1134'
b_H	'7.6934'	'10.5325'	'9.0813'	'10.2402'	'0.0609'
\nu	'14.4277'	'25.5654'	'281.9824'	'20.6739'	'0.0604'
BP	'443.0151'	'449.9879'	'451.4998'	'443.5615'	'0.0558'

13.3. 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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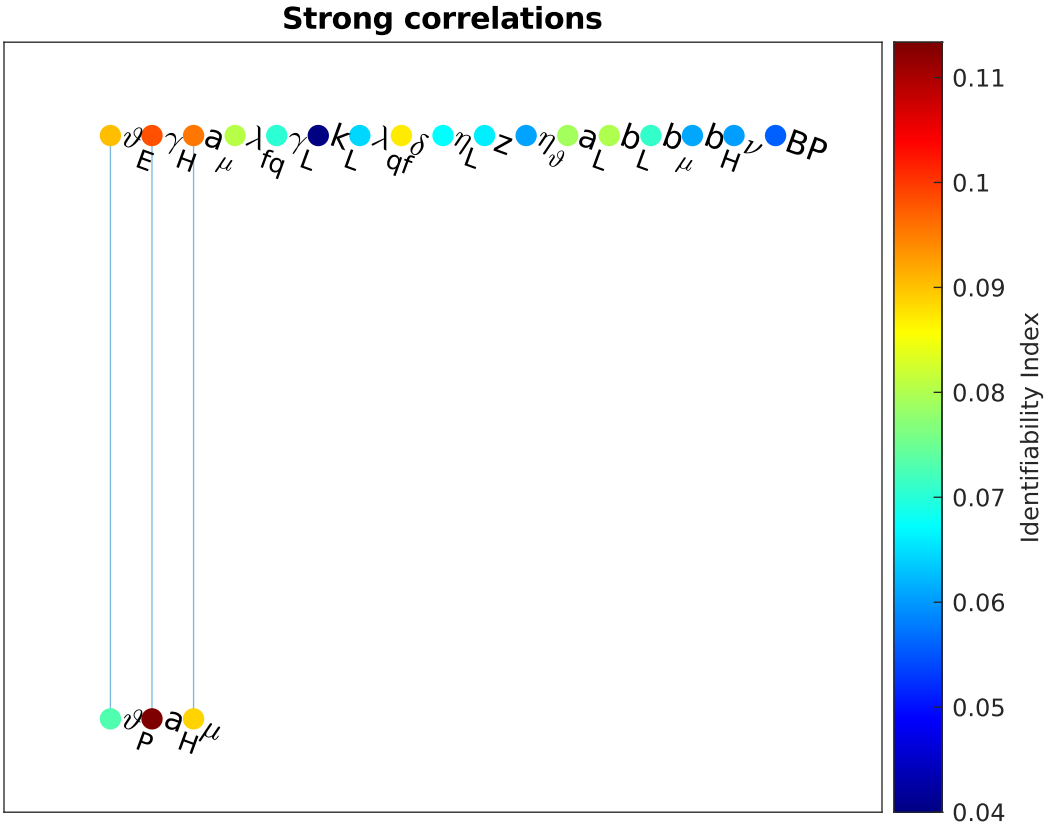
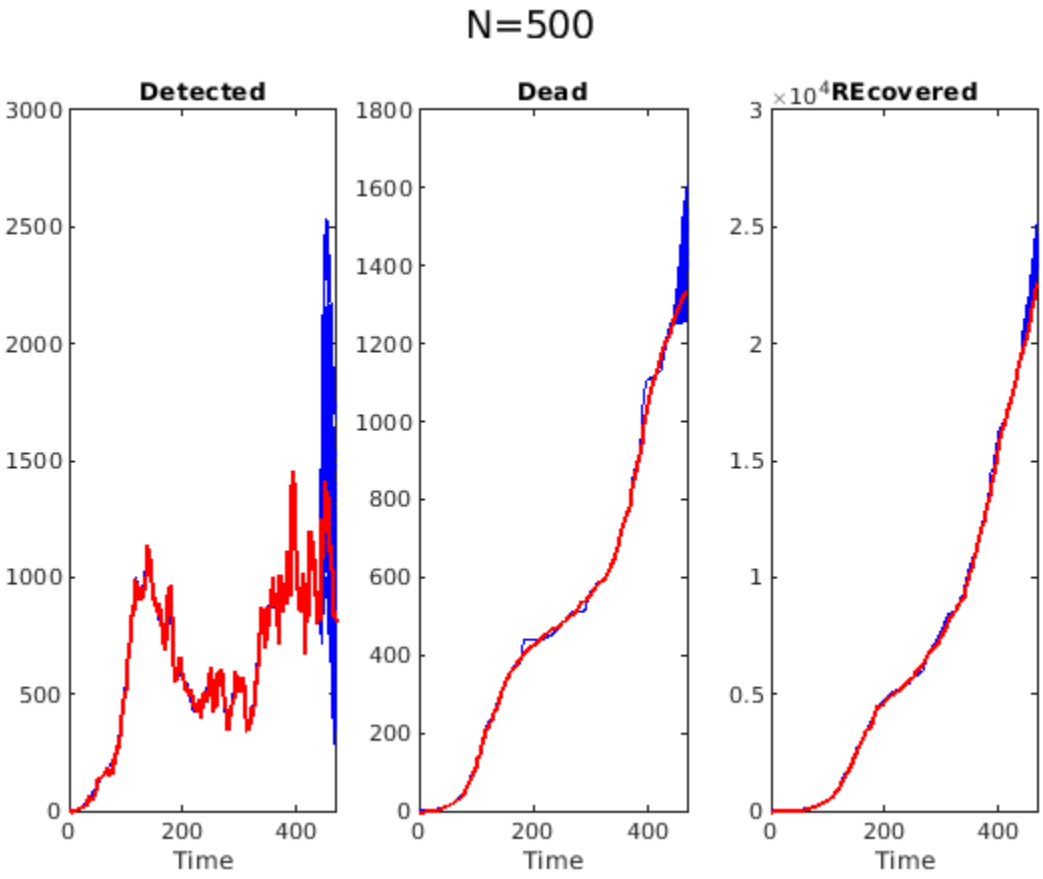
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04

13.4. Uncertainty analisys



Chapter 14. Extension number14

14.1. Basic information

The extension to be validated consists of the time series from the data469 to the 522. The status of the validation is: COMPLETED.

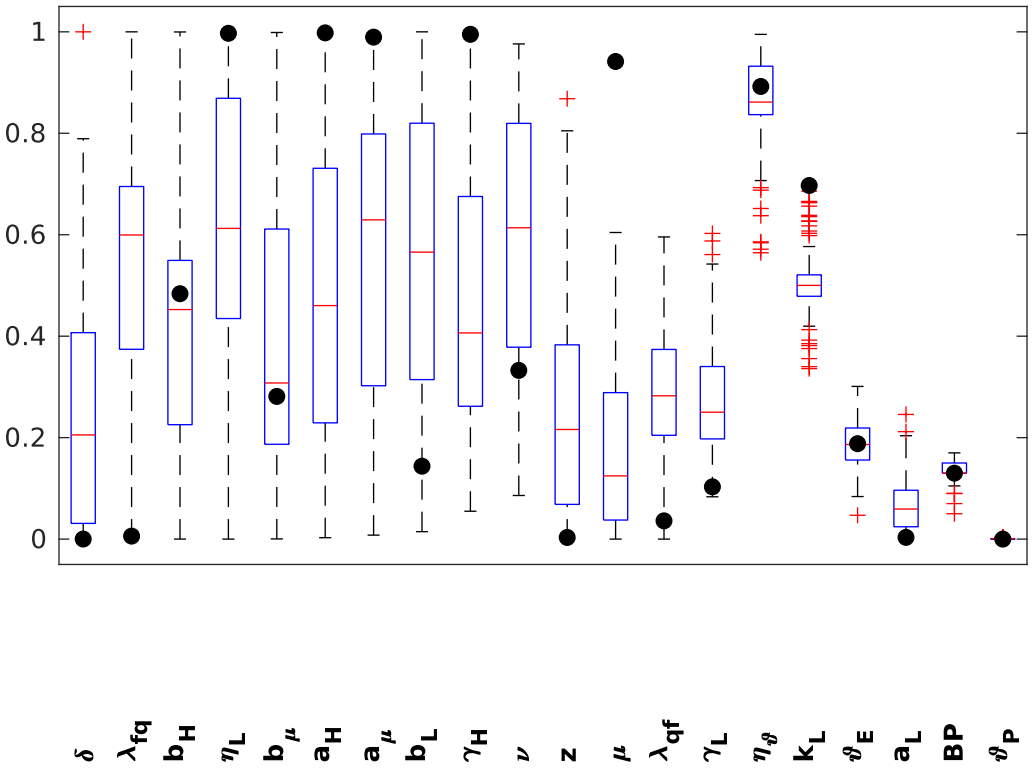
The number of estimations needed to perform the validation was1000.

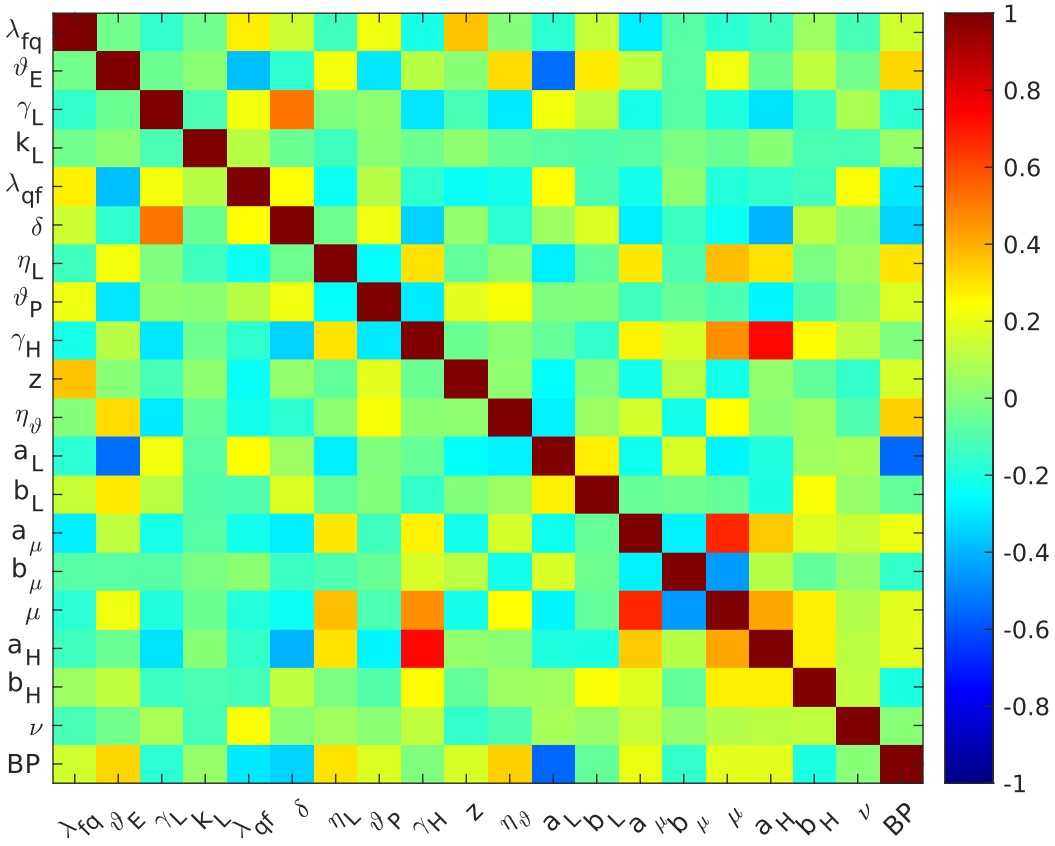
14.2. Estimated parameters with their intervals

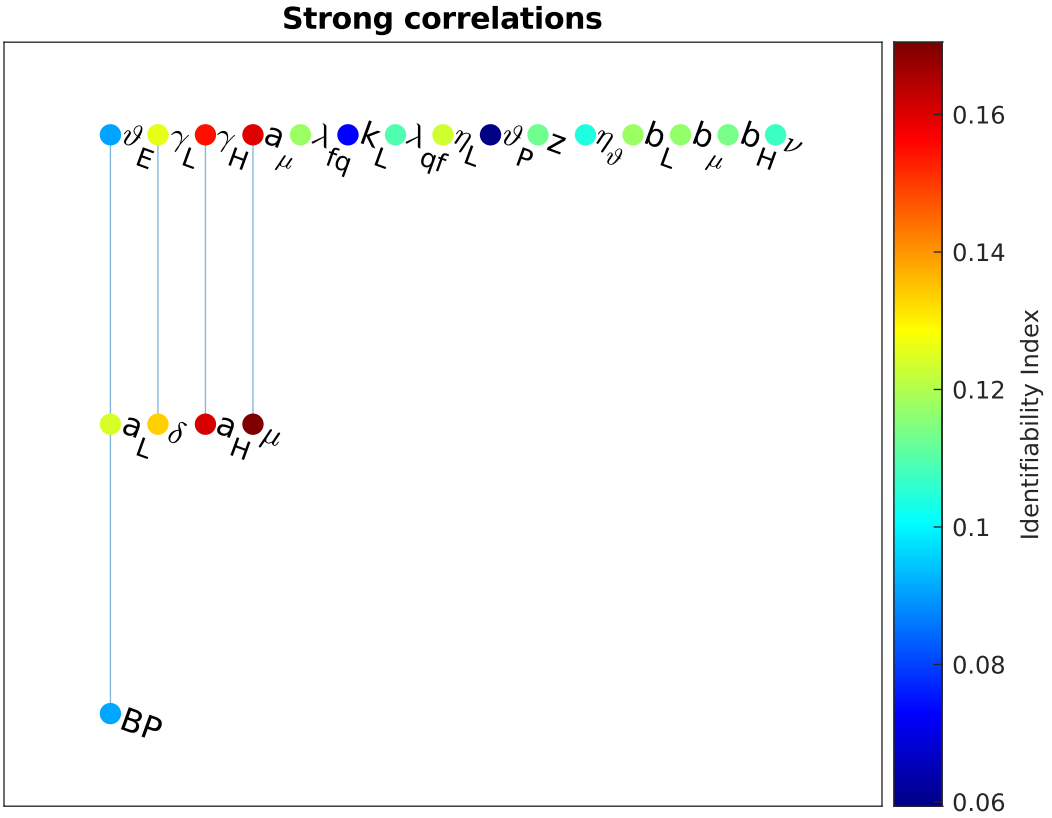
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.5422'	'0.6568'	'0.5995'	'0.0059'	'0.1178'
\vartheta_E	'0.175'	'0.1981'	'0.1865'	'0.1881'	'0.0907'
\gamma_L	'0.203'	'0.2973'	'0.2501'	'0.103'	'0.1259'
k_L	'5.195'	'5.8072'	'5.5011'	'7.2734'	'0.0731'
\lambda_{qf}	'0.2445'	'0.3205'	'0.2825'	'0.036'	'0.1097'
\delta	'0.0233'	'0.0384'	'0.0308'	'0'	'0.1339'
\eta_L	'0.5536'	'0.6714'	'0.6125'	'0.9971'	'0.1234'
\vartheta_P	'0'	'0.0016'	'0.0008'	'0'	'0.0594'
\gamma_H	'0.3398'	'0.4731'	'0.4064'	'0.9951'	'0.1545'
z	'4.7079'	'8.2586'	'6.4833'	'0.0975'	'0.1131'
\eta_\vartheta	'0.8171'	'0.9059'	'0.8615'	'0.8923'	'0.1044'
a_L	'1.4887'	'2.1707'	'1.8297'	'1.0478'	'0.1241'
b_L	'7.9932'	'9.846'	'8.9196'	'3.012'	'0.1178'
a_\mu	'8.8575'	'10.7639'	'9.8107'	'14.8537'	'0.1601'
b_\mu	'4.4294'	'6.1896'	'5.3095'	'4.9381'	'0.117'
\mu	'0.0524'	'0.1969'	'0.1246'	'0.9415'	'0.1705'
a_H	'6.4624'	'8.4266'	'7.4445'	'14.9715'	'0.1607'
b_H	'6.5359'	'8.1346'	'7.3353'	'7.7722'	'0.1138'
\nu	'276.0497'	'337.7082'	'306.879'	'166.3184'	'0.1075'
BP	'468.2216'	'468.7784'	'468.5'	'468.5'	'0.0914'

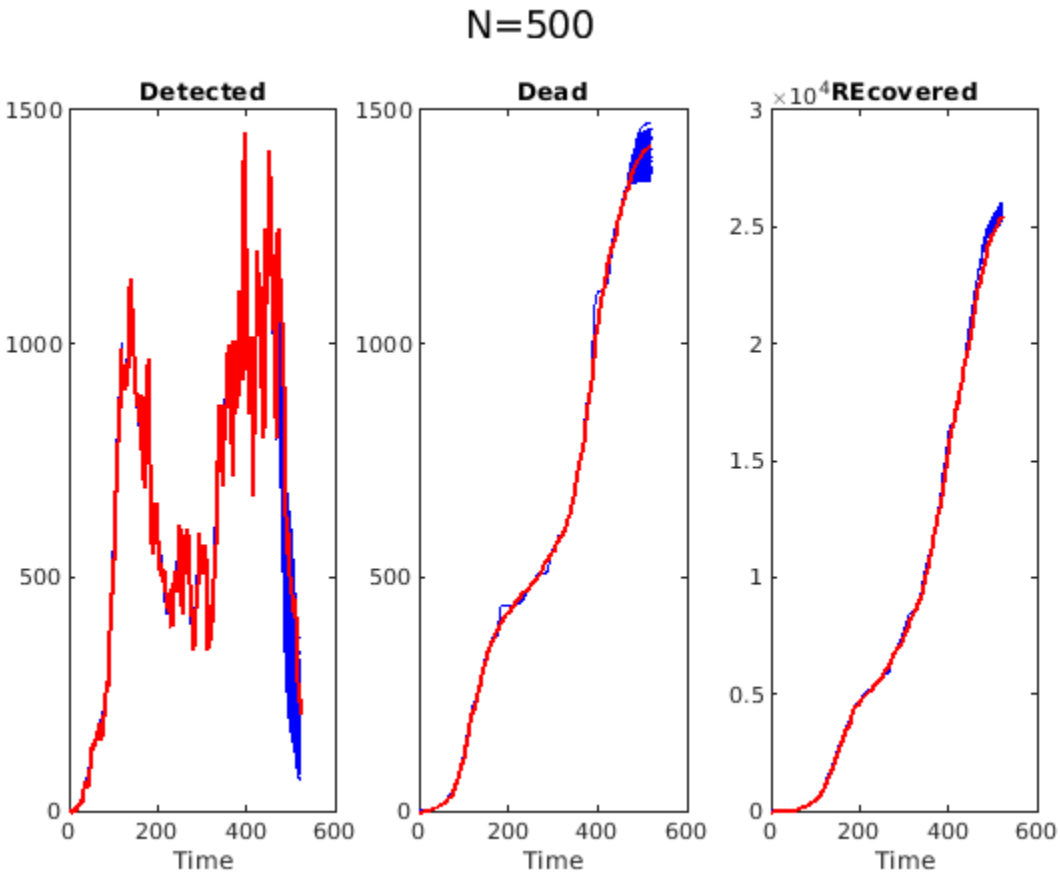
14.3. Identifiability analisys




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
ϑ_E γ_L γ_H a_μ λ_{fq} k_L λ_{qf} η_L ϑ_P z η_ϑ b_L b_μ b_H ν
a_L δ a_H μ
B_P
0.16
0.14
0.12
0.1
0.08
0.06
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 data522 to the 608. The status of the validation is: COMPLETED.

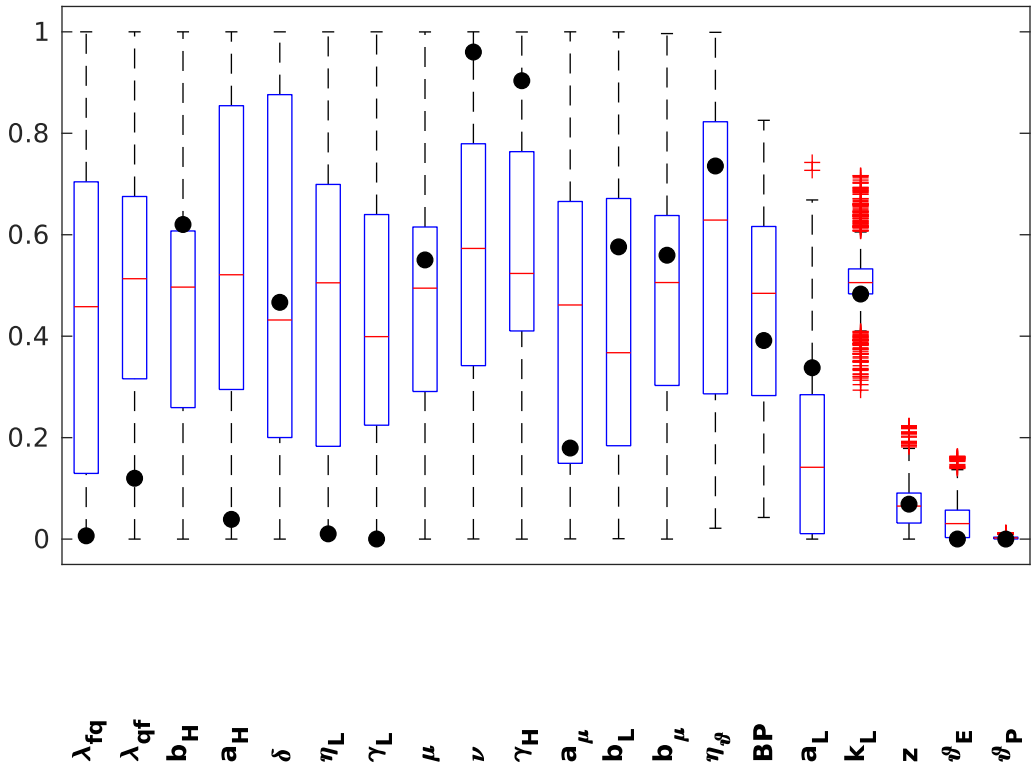
The number of estimations needed to perform the validation was1000.

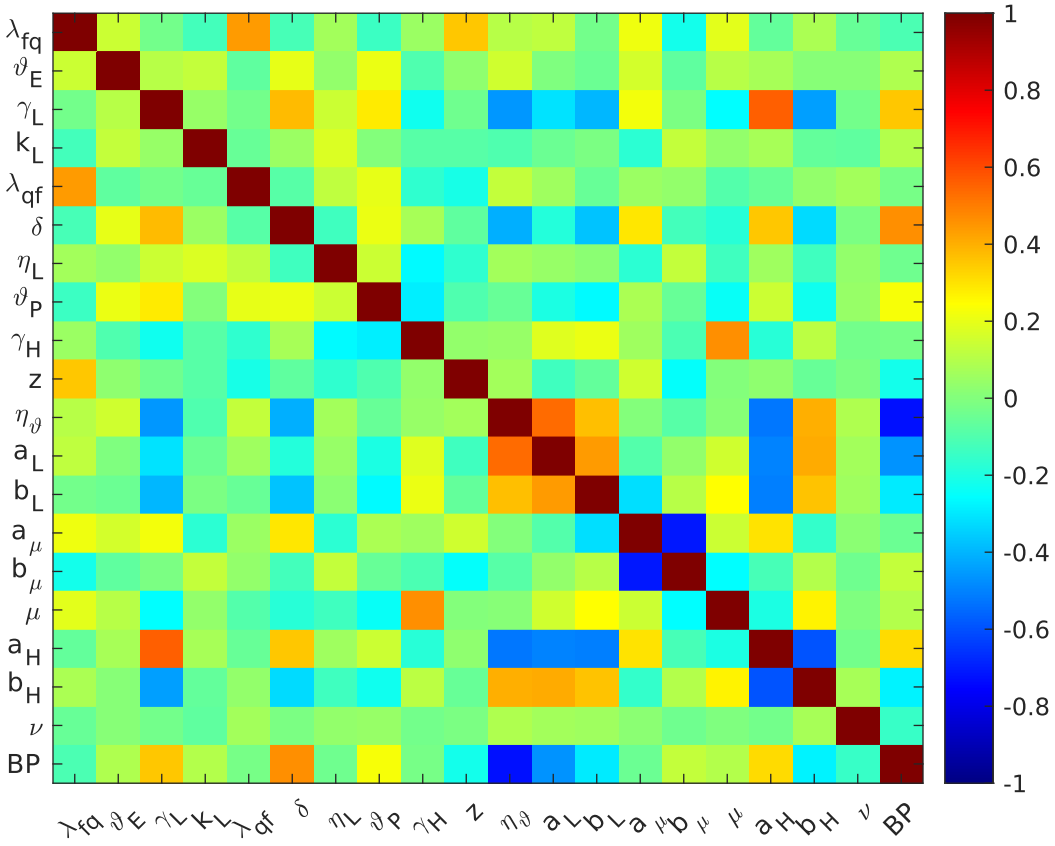
15.2. Estimated parameters with their intervals

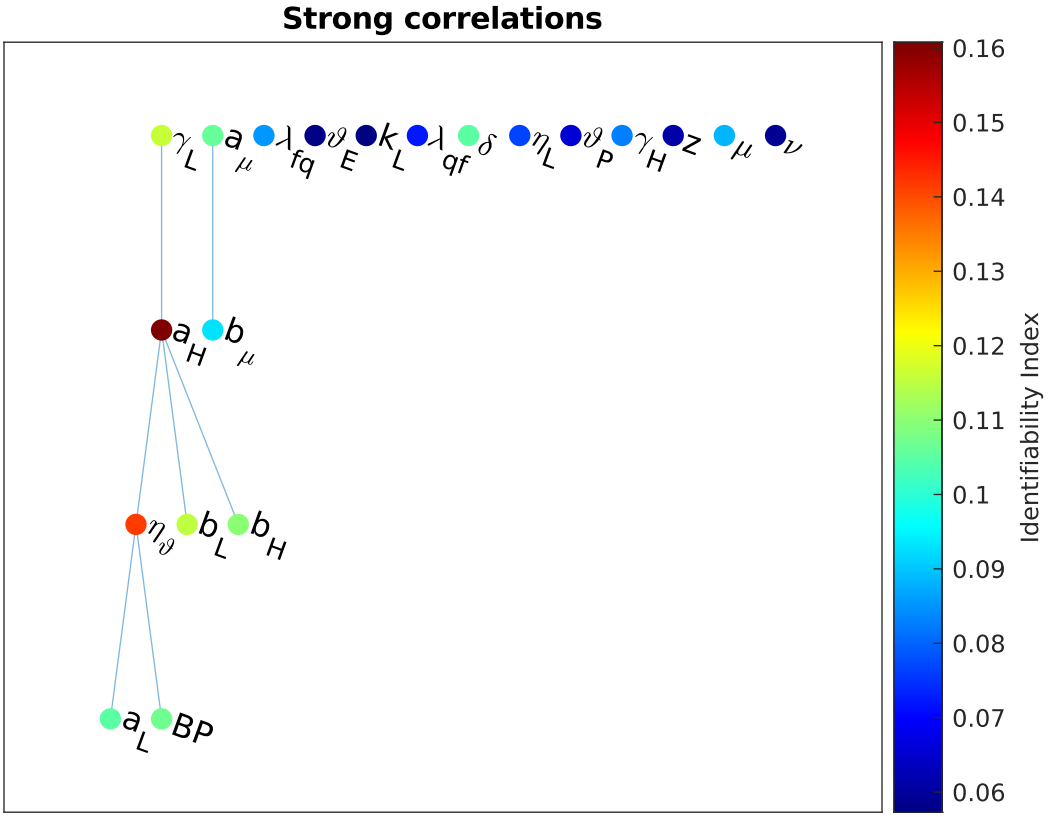
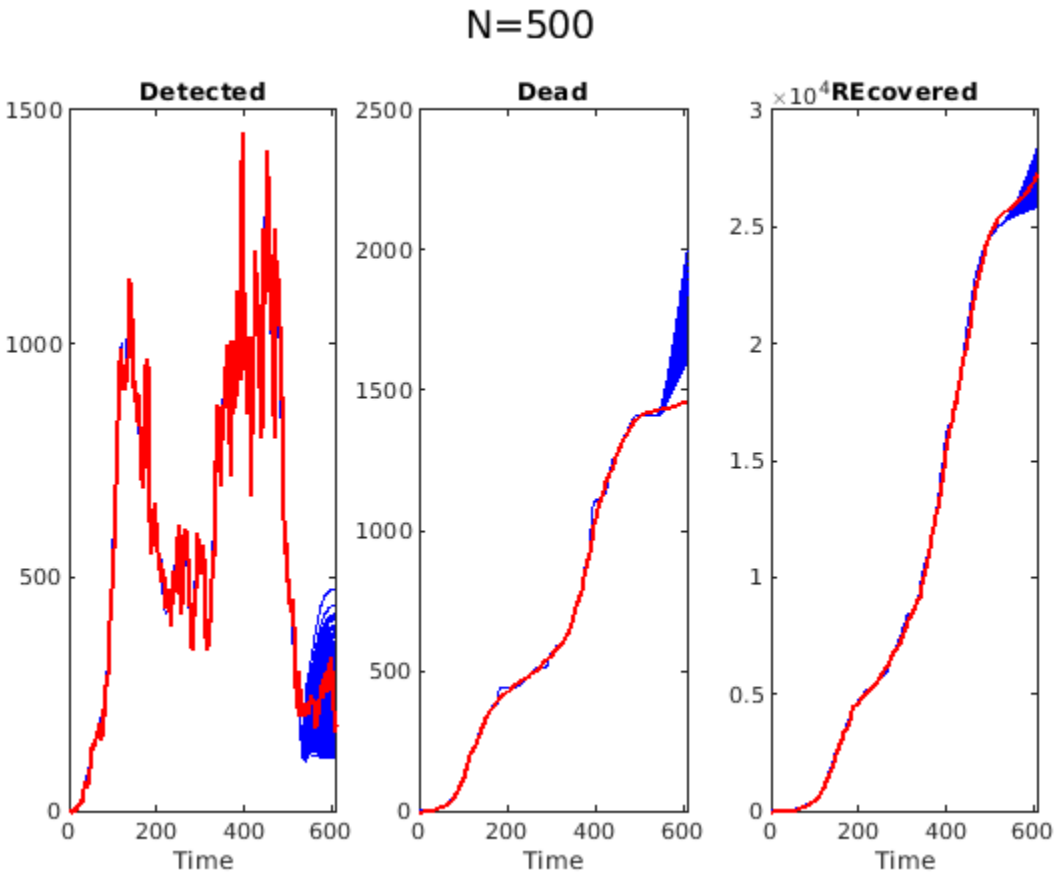
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4307'	'0.4856'	'0.4582'	'0.0065'	'0.0855'
\vartheta_E	'0.019'	'0.042'	'0.0305'	'0.0001'	'0.0581'
\gamma_L	'0.3745'	'0.4238'	'0.3991'	'0.0002'	'0.116'
k_L	'5.4332'	'5.6684'	'5.5508'	'5.3476'	'0.0573'
\lambda_{qf}	'0.49'	'0.5366'	'0.5133'	'0.1199'	'0.0724'
\delta	'0.0603'	'0.0693'	'0.0648'	'0.07'	'0.105'
\eta_L	'0.4789'	'0.5316'	'0.5052'	'0.0103'	'0.0769'
\vartheta_P	'0.0002'	'0.0046'	'0.0024'	'0.0001'	'0.0657'
\gamma_H	'0.4992'	'0.5482'	'0.5237'	'0.9036'	'0.0829'
z	'1.6263'	'2.2781'	'1.9522'	'2.066'	'0.0612'
\eta_\vartheta	'0.6038'	'0.6541'	'0.6289'	'0.7355'	'0.1414'
a_L	'2.7294'	'3.2351'	'2.9823'	'5.7291'	'0.105'
b_L	'5.7781'	'6.5099'	'6.144'	'9.0653'	'0.1155'
a_\mu	'7.0795'	'7.8434'	'7.4615'	'3.513'	'0.1066'
b_\mu	'7.771'	'8.3904'	'8.0807'	'8.8346'	'0.0929'
\mu	'0.4694'	'0.5199'	'0.4947'	'0.5503'	'0.0886'
a_H	'7.9053'	'8.6854'	'8.2954'	'1.5448'	'0.1608'
b_H	'7.6532'	'8.256'	'7.9546'	'9.6825'	'0.1103'
\nu	'274.8112'	'298.1862'	'286.4987'	'480.0773'	'0.0592'
BP	'529.162'	'533.838'	'531.5'	'519.4999'	'0.1072'

15.3. 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
γ_L
a_μ
λ_{fq}
ϑ_E
k_L
λ_{qf}
δ
η_L
ϑ_P
γ_H
z
μ
ν
a_H
b_μ
η_ϑ
b_L
b_H
a_L
BP
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
Identifiability Index

15.4. Uncertainty analisys