Validation process forCUNDINAMARCA

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 73. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

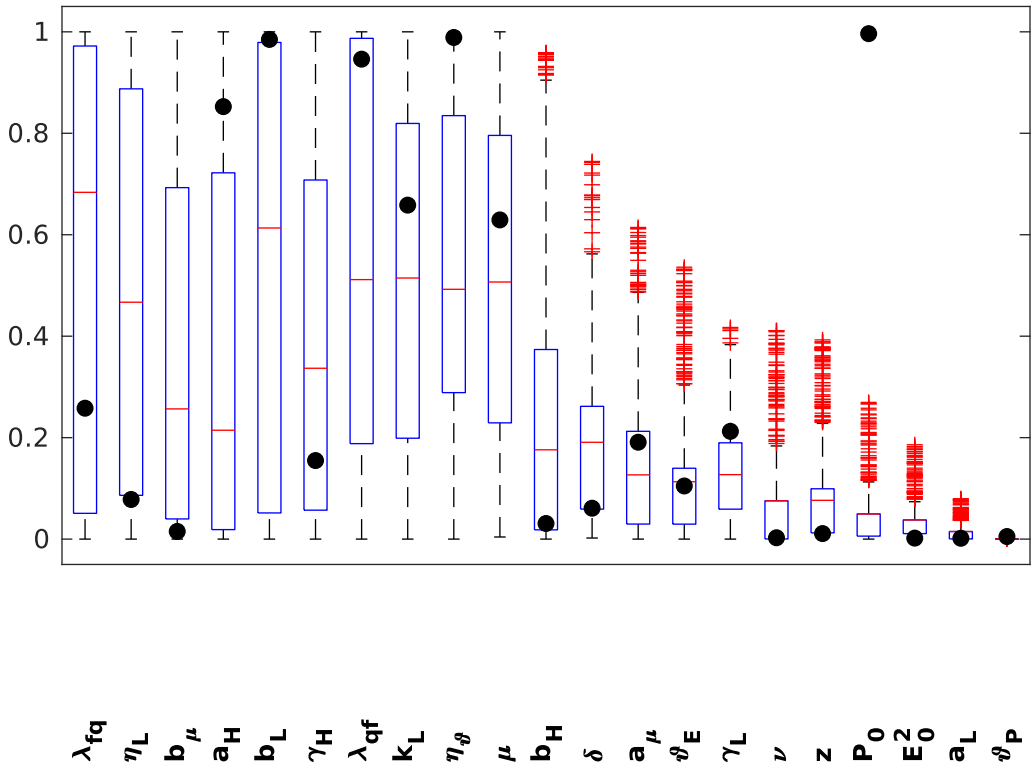
1.2. Estimated parameters with their intervals

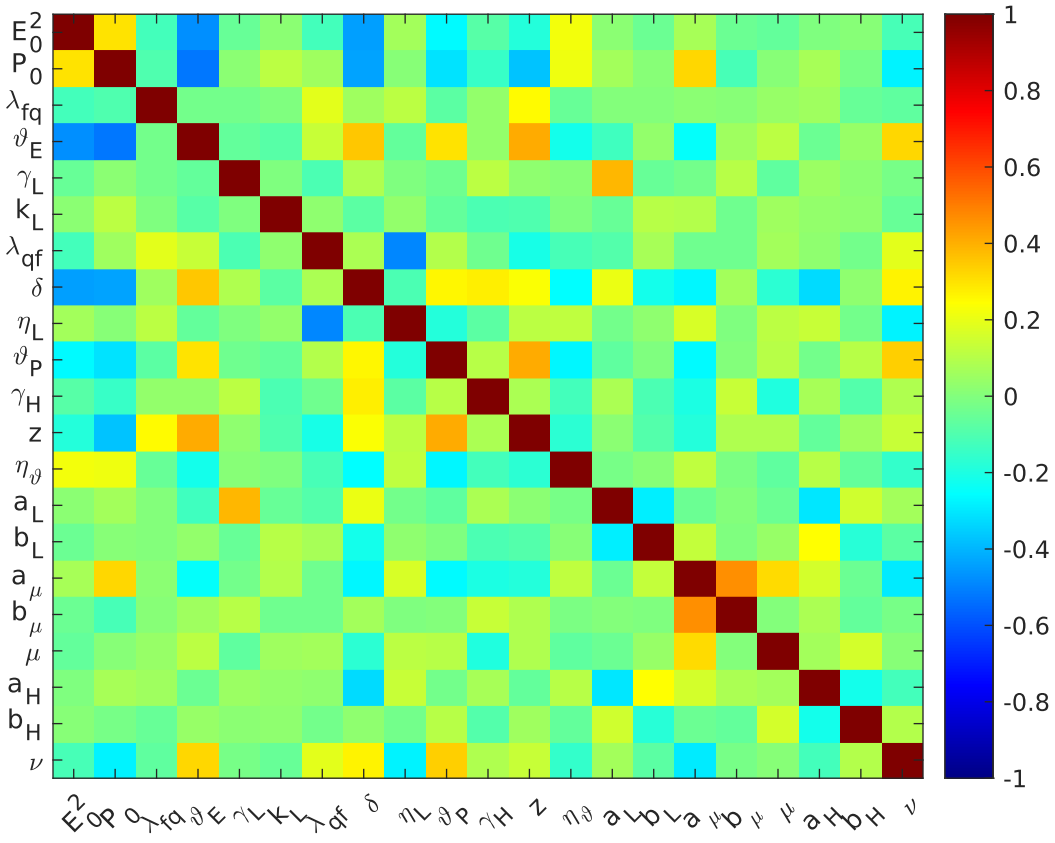
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
E^2_0	'0.6492'	'8.8029'	'75.5602'	'3.9124'	'0.0846'
P_0	'337.9565'	'400'	'19.8552'	'398.5538'	'0.1144'
\lambda_{fq}	'0.1954'	'0.3255'	'0.6836'	'0.258'	'0.0801'
\vartheta_E	'0.0778'	'0.1389'	'0.1134'	'0.1047'	'0.1098'
\gamma_L	'0.1789'	'0.2126'	'0.1273'	'0.2124'	'0.0591'
k_L	'1'	'9.1'	'5.6323'	'6.9252'	'0.0706'
\lambda_{qf}	'0.9322'	'0.955'	'0.5115'	'0.9461'	'0.0865'
\delta	'0.0072'	'0.0091'	'0.0287'	'0.0091'	'0.1019'
\eta_L	'0.077'	'0.1156'	'0.467'	'0.0781'	'0.087'
\vartheta_P	'0.0037'	'0.0067'	'0.0002'	'0.0051'	'0.0764'
\gamma_H	'0.0087'	'0.3484'	'0.3368'	'0.1548'	'0.0852'
z	'0.2805'	'0.3264'	'2.2952'	'0.3262'	'0.0907'
\eta_\vartheta	'0.8816'	'1'	'0.4924'	'0.9888'	'0.0819'
a_L	'1'	'1.1641'	'1.209'	'1.0231'	'0.0715'
b_L	'12.3517'	'14.8676'	'9.5865'	'14.791'	'0.0854'
a_\mu	'2.3078'	'3.8269'	'2.7794'	'3.6737'	'0.0883'
b_\mu	'1.1235'	'2.529'	'4.5932'	'1.2121'	'0.0758'
\mu	'0.37'	'0.9677'	'0.5068'	'0.6292'	'0.0774'
a_H	'7.5432'	'15'	'4.0049'	'12.9359'	'0.0868'
b_H	'1'	'9.9448'	'3.4799'	'1.4302'	'0.0783'
\nu	'0.0604'	'2.4161'	'37.7686'	'1.322'	'0.096'

1.3. Identifiability analisys




E_0^2
P_0
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
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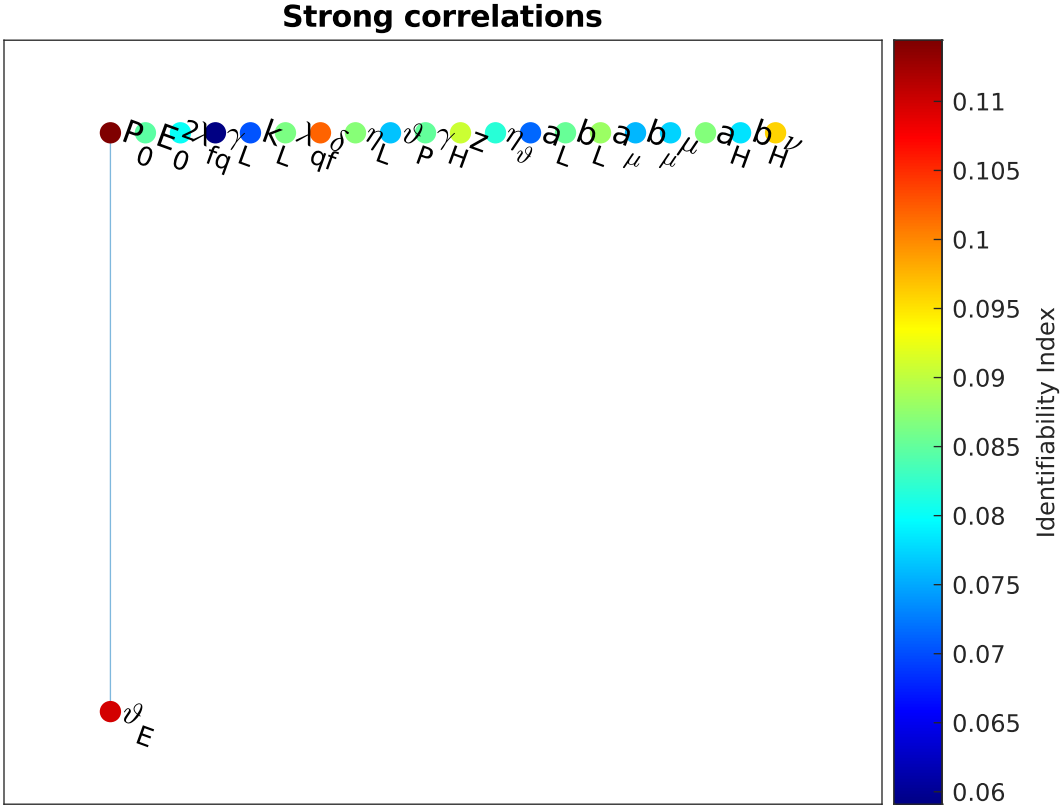
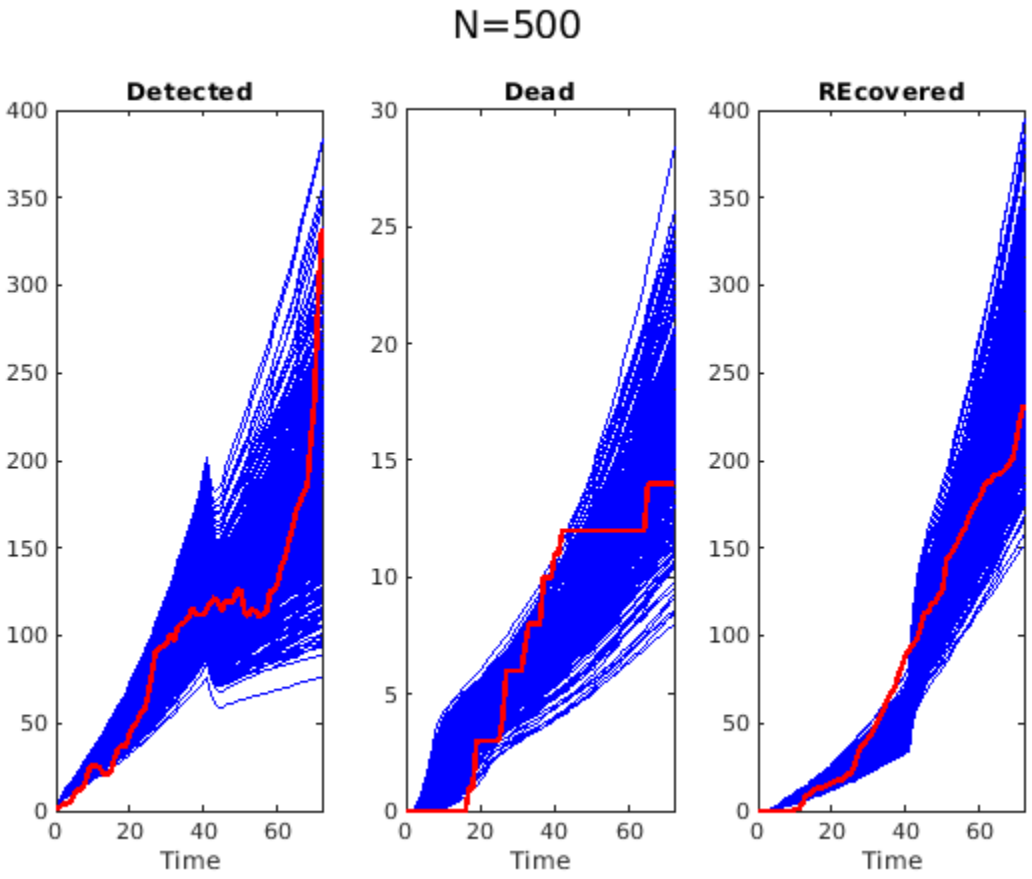
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.11
0.105
0.1
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06

1.4. Uncertainty analisys



Chapter 2. Extension number2

2.1. Basic information

The extension to be validated consists of the time series from the data73 to the 112. The status of the validation is: COMPLETED.

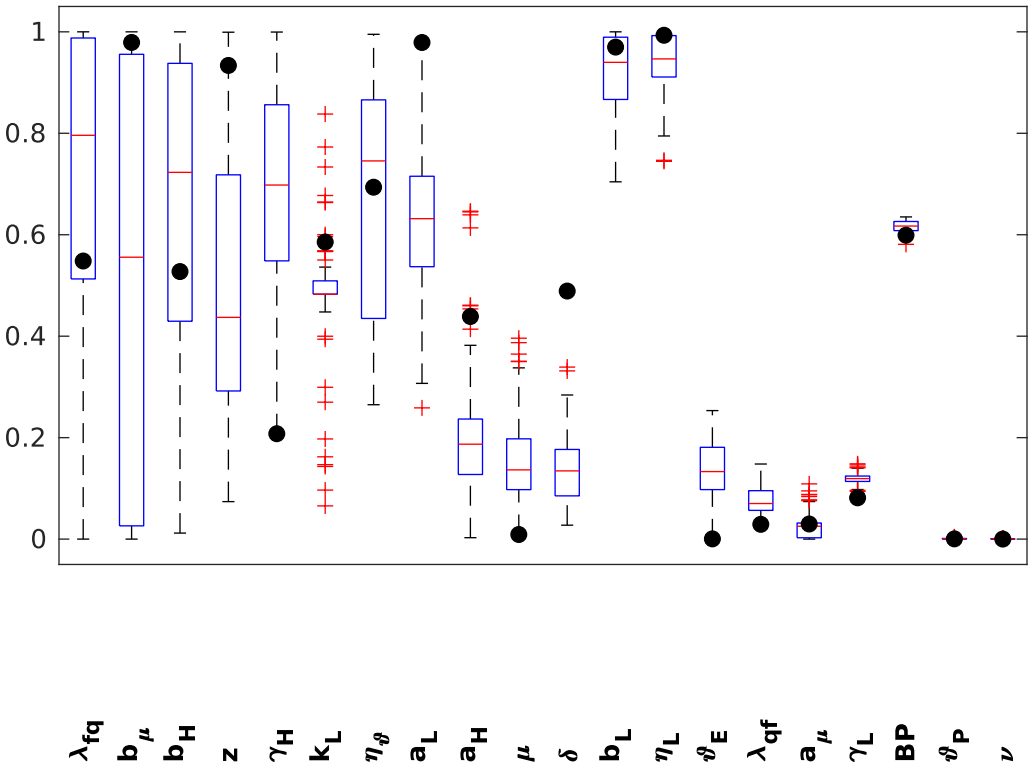
The number of estimations needed to perform the validation was1000.

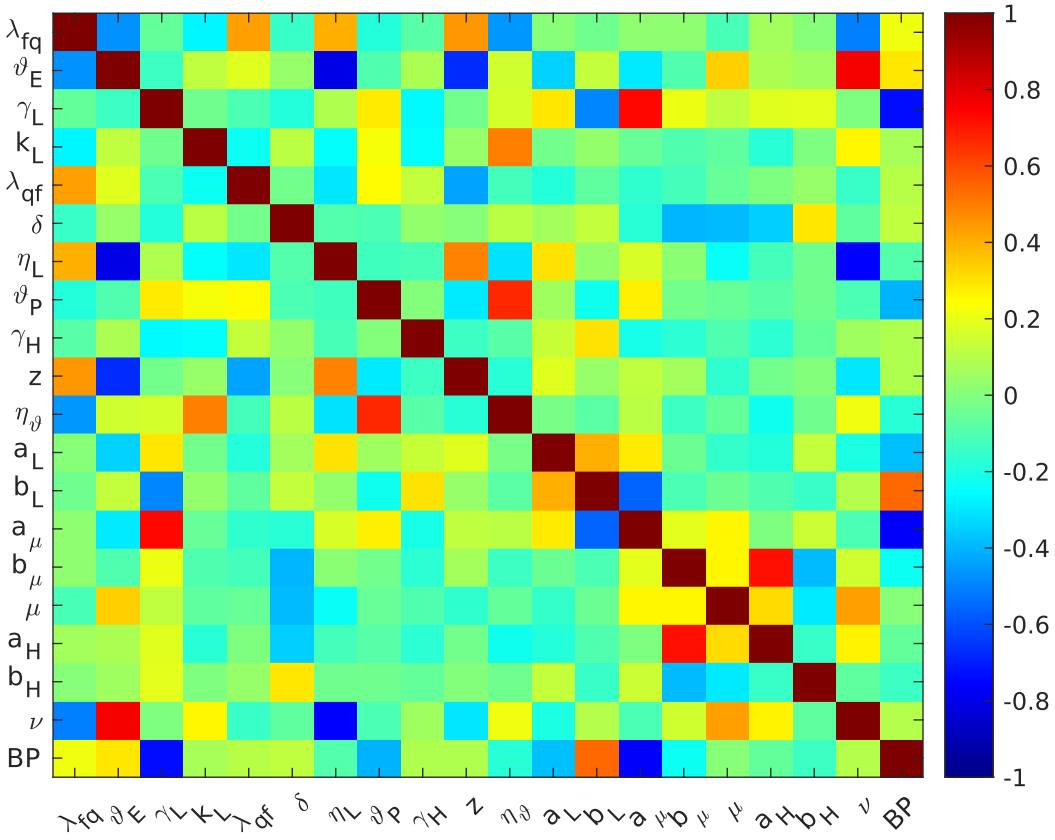
2.2. Estimated parameters with their intervals

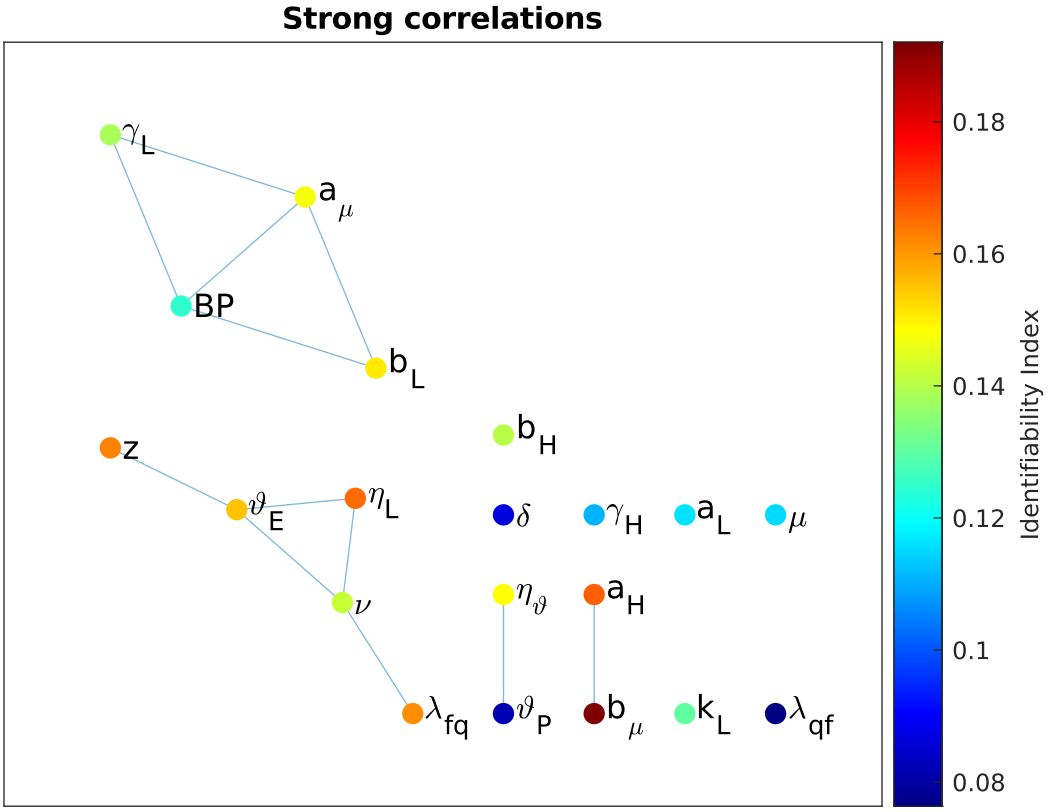
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.7218'	'0.8702'	'0.796'	'0.5482'	'0.1612'
\vartheta_E	'0.1063'	'0.1638'	'0.1351'	'0.0005'	'0.1553'
\gamma_L	'0.0843'	'0.1542'	'0.1192'	'0.0814'	'0.1385'
k_L	'4.7143'	'5.9768'	'5.3456'	'6.2707'	'0.1303'
\lambda_{qf}	'0.0579'	'0.0832'	'0.0705'	'0.0291'	'0.0764'
\delta	'0.0163'	'0.0241'	'0.0202'	'0.0733'	'0.0869'
\eta_L	'0.8874'	'1'	'0.9464'	'0.9932'	'0.1653'
\vartheta_P	'0.0001'	'0.0016'	'0.0008'	'0.0004'	'0.082'
\gamma_H	'0.6428'	'0.7532'	'0.698'	'0.2077'	'0.1109'
z	'10.7633'	'15.4621'	'13.1127'	'28.0124'	'0.1623'
\eta_\vartheta	'0.6819'	'0.8091'	'0.7455'	'0.6937'	'0.1484'
a_L	'9.1127'	'10.4871'	'9.7999'	'14.7056'	'0.1166'
b_L	'13.3665'	'14.9404'	'14.1535'	'14.5786'	'0.1508'
a_\mu	'1'	'1.7601'	'1.3576'	'1.4168'	'0.1476'
b_\mu	'7.2198'	'10.3399'	'8.7798'	'14.7073'	'0.192'
\mu	'0.0895'	'0.1837'	'0.1366'	'0.0091'	'0.1152'
a_H	'2.448'	'4.9134'	'3.6807'	'7.1431'	'0.1663'
b_H	'9.8944'	'12.3489'	'11.1216'	'8.3839'	'0.1402'
\nu	'0'	'21.7582'	'0.2004'	'0.0276'	'0.142'
BP	'68.9892'	'70.0105'	'69.4999'	'67.5'	'0.1248'

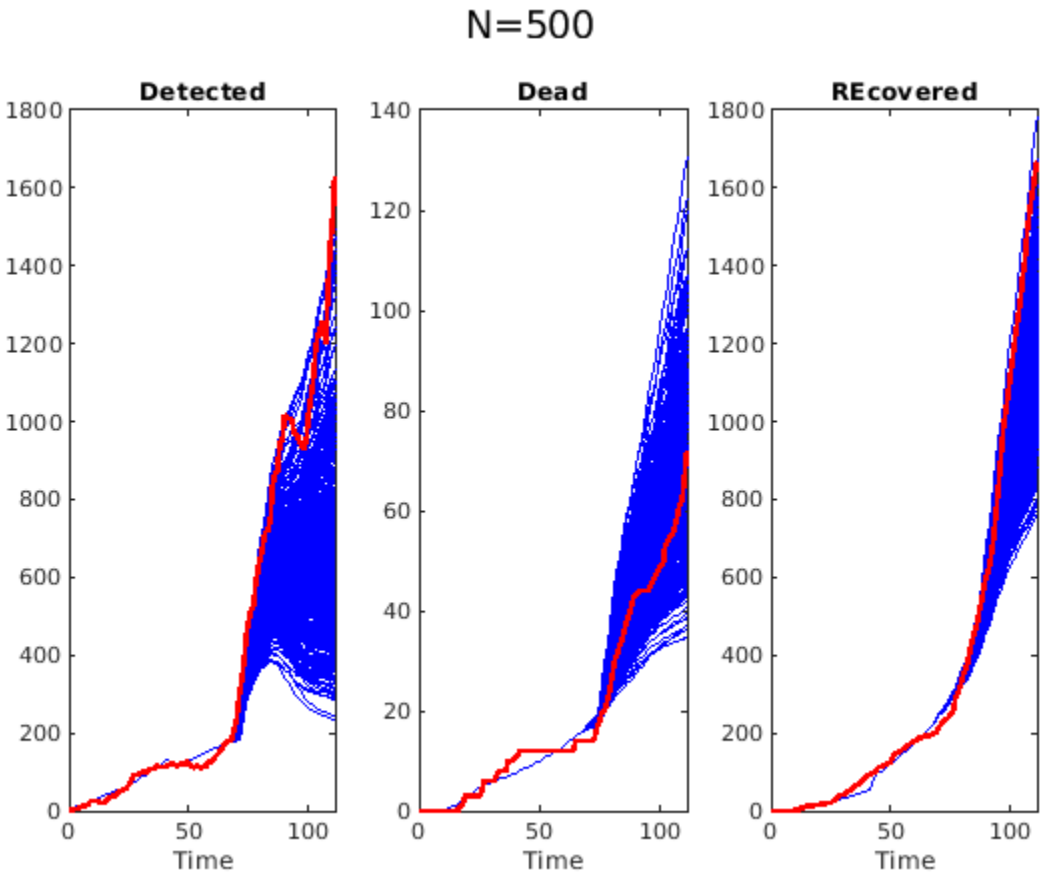
2.3. Identifiability analisys




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
BP
b_L
z
ϑ_E
η_L
ν
λ_{fq}
b_H
δ
γ_H
a_L
μ
η_ϑ
a_H
ϑ_P
b_μ
k_L
λ_{qf}
0.18
0.16
0.14
0.12
0.1
0.08
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 data112 to the 157. The status of the validation is: COMPLETED.

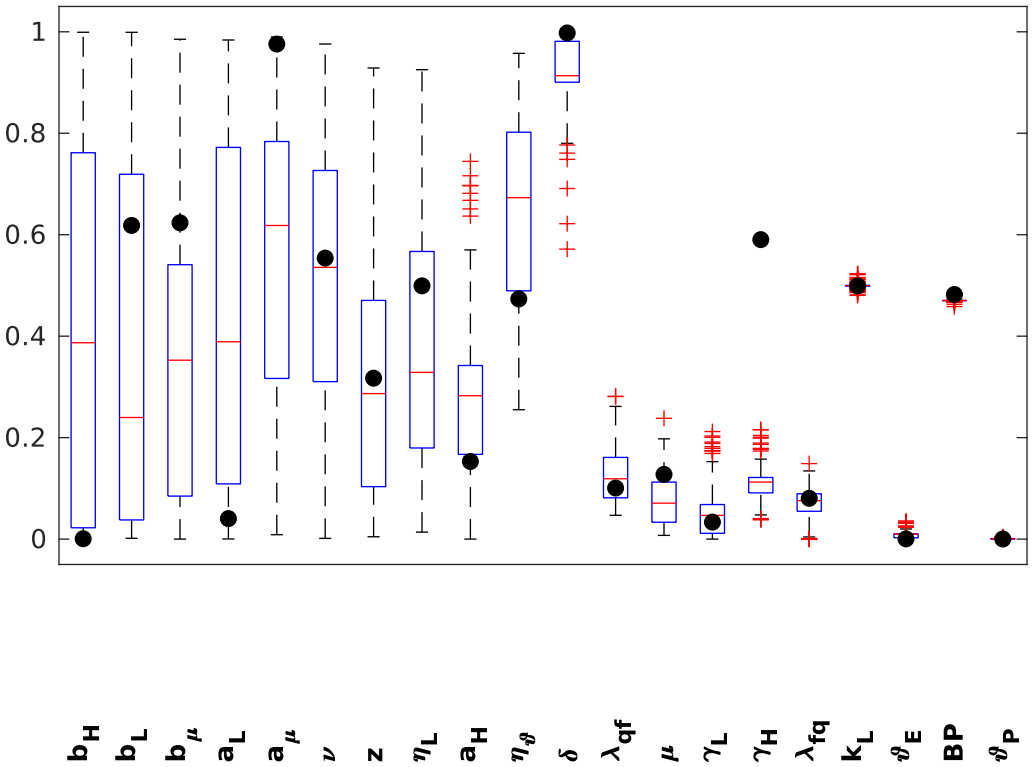
The number of estimations needed to perform the validation was1000.

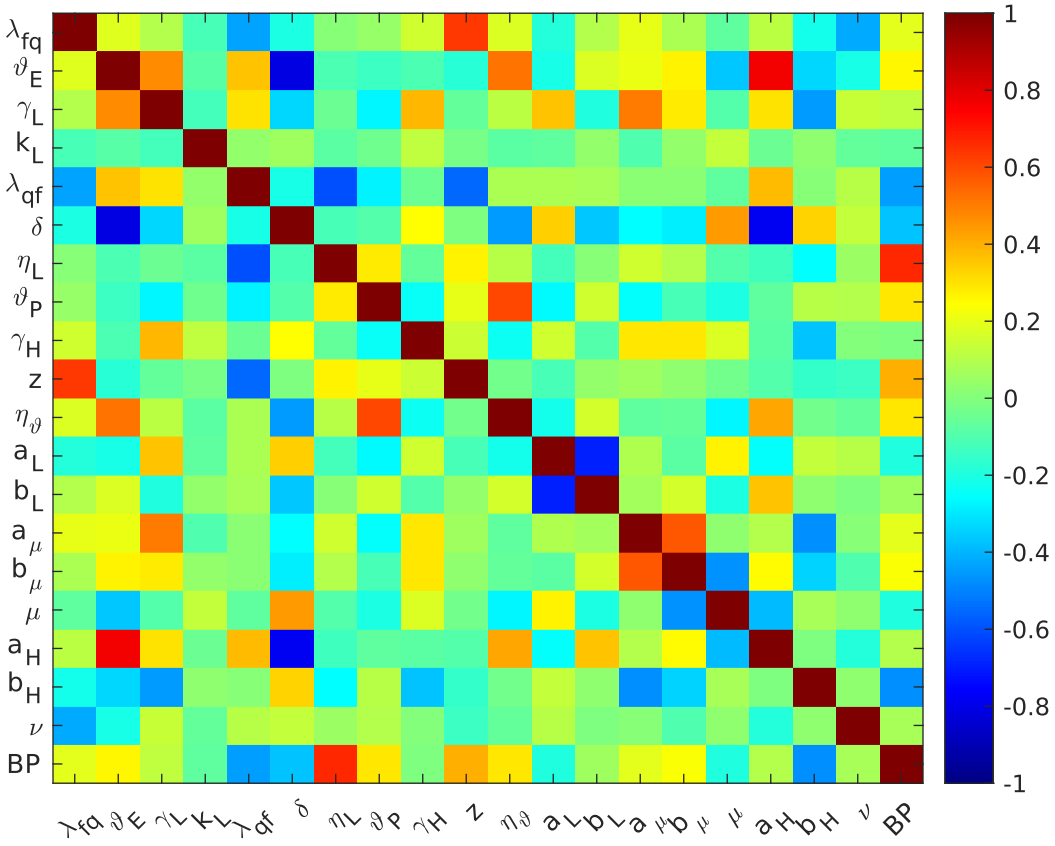
3.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0685'	'0.083'	'0.0757'	'0.0804'	'0.0902'
\vartheta_E	'0'	'0.0448'	'0.0097'	'0.0005'	'0.1566'
\gamma_L	'0.0286'	'0.0649'	'0.0467'	'0.0335'	'0.1136'
k_L	'5.3699'	'5.6234'	'5.4967'	'5.4918'	'0.0554'
\lambda_{qf}	'0.0967'	'0.141'	'0.1189'	'0.1007'	'0.1233'
\delta	'0.1263'	'0.1477'	'0.137'	'0.1497'	'0.1937'
\eta_L	'0.2766'	'0.3807'	'0.3286'	'0.4993'	'0.1428'
\vartheta_P	'0.0001'	'0.0015'	'0.0008'	'0.0002'	'0.0844'
\gamma_H	'0.0792'	'0.1456'	'0.1124'	'0.5903'	'0.098'
z	'7.0699'	'10.1385'	'8.6042'	'9.5161'	'0.1402'
\eta_\vartheta	'0.6322'	'0.7138'	'0.673'	'0.4734'	'0.1403'
a_L	'5.4317'	'7.4597'	'6.4457'	'1.5659'	'0.159'
b_L	'3.3096'	'5.4018'	'4.3557'	'9.6568'	'0.1493'
a_\mu	'8.8517'	'10.4578'	'9.6548'	'14.661'	'0.1528'
b_\mu	'5.147'	'6.7278'	'5.9374'	'9.7296'	'0.1411'
\mu	'0.0565'	'0.0851'	'0.0708'	'0.1275'	'0.0839'
a_H	'4.2133'	'5.7008'	'4.9571'	'3.1415'	'0.1632'
b_H	'5.3205'	'7.5175'	'6.419'	'1.0101'	'0.1512'
\nu	'239.5652'	'296.0604'	'267.8128'	'276.9649'	'0.1058'
BP	'112.2553'	'112.7447'	'112.5'	'113.5'	'0.0983'

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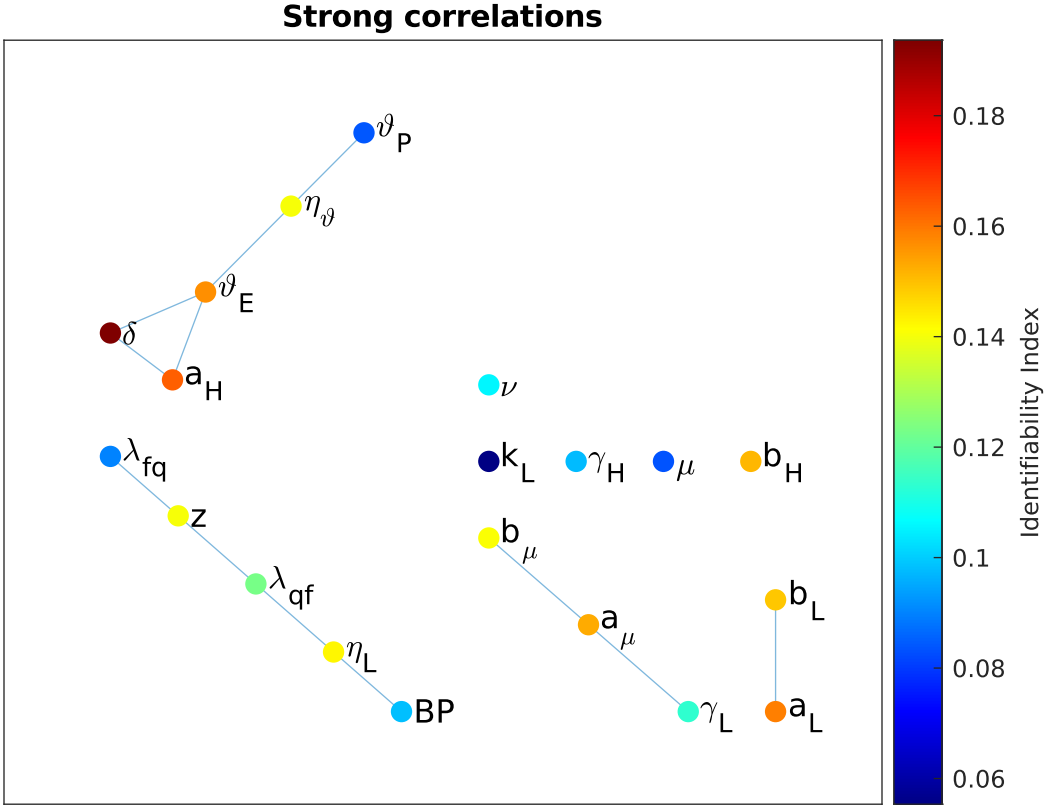
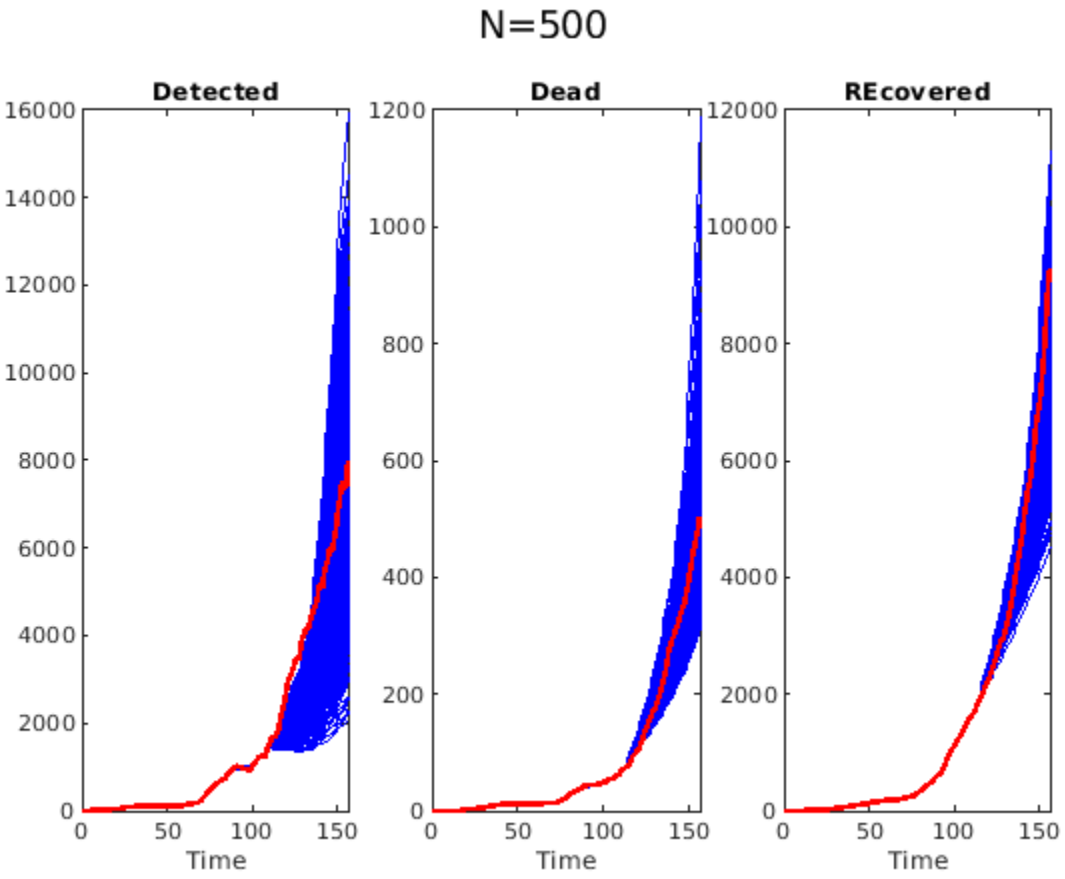
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
ϑ_P
η_ϑ
ϑ_E
δ
a_H
ν
λ_{fq}
k_L
γ_H
μ
b_H
z
b_μ
λ_{qf}
b_L
a_μ
η_L
BP
γ_L
a_L
0.18
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 data157 to the 206. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

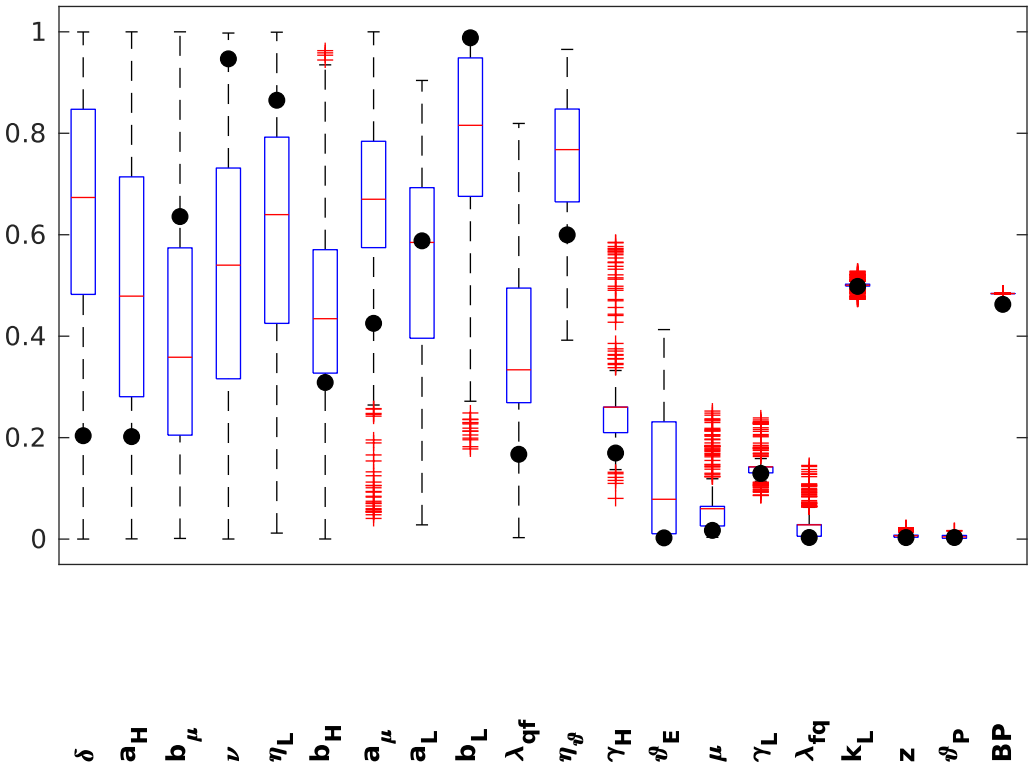
4.2. Estimated parameters with their intervals

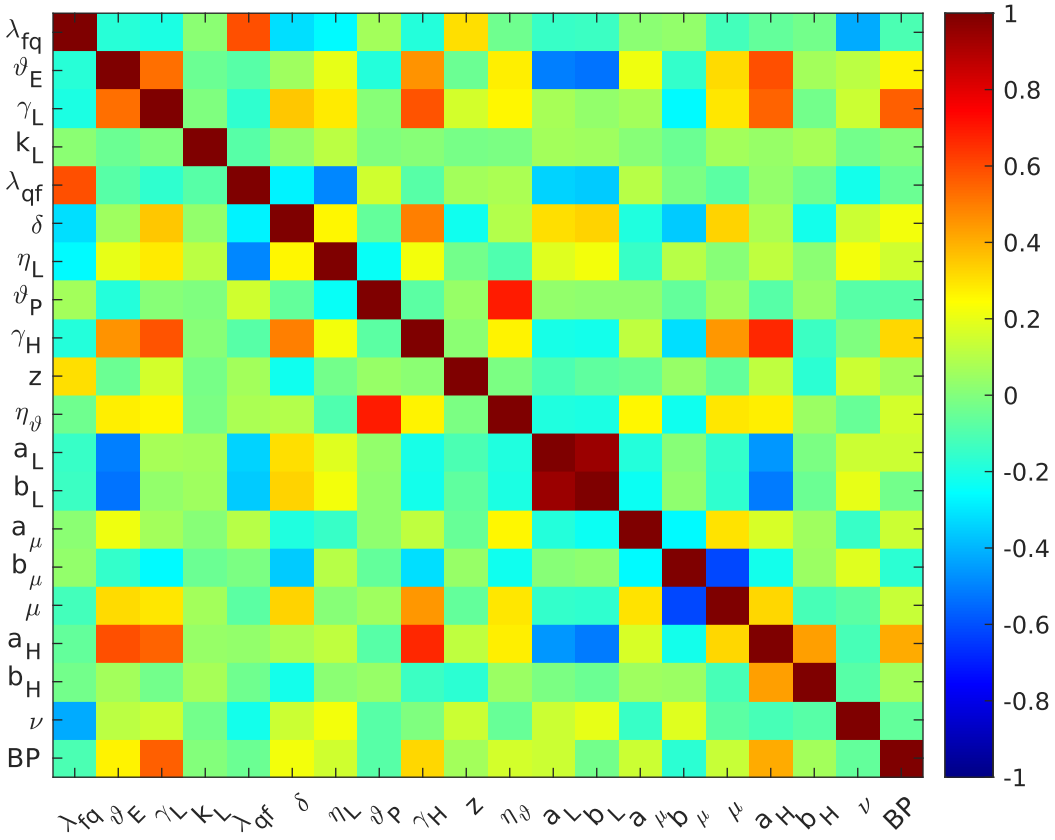
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0071'	'0.0286'	'0.0032'	'0.1086'
\vartheta_E	'0.0001'	'0.0052'	'0.0785'	'0.0024'	'0.1524'
\gamma_L	'0.0832'	'0.1348'	'0.1424'	'0.1295'	'0.1462'
k_L	'1.4444'	'10'	'5.5048'	'5.4833'	'0.0426'
\lambda_{qf}	'0.0441'	'0.3627'	'0.3357'	'0.1672'	'0.1052'
\delta	'0.0034'	'0.0662'	'0.101'	'0.0306'	'0.1131'
\eta_L	'0.133'	'0.8781'	'0.6396'	'0.8651'	'0.0972'
\vartheta_P	'0.0021'	'0.005'	'0.0045'	'0.0031'	'0.0632'
\gamma_H	'0.1588'	'0.3797'	'0.2603'	'0.1697'	'0.1422'
z	'0.0152'	'0.0991'	'0.1995'	'0.0898'	'0.0578'
\eta_\vartheta	'0.5932'	'0.704'	'0.7676'	'0.5998'	'0.102'
a_L	'4.1006'	'13.4426'	'9.1855'	'9.2318'	'0.1315'
b_L	'6.2633'	'15'	'12.4152'	'14.835'	'0.1542'
a_\mu	'1'	'11.2344'	'10.3787'	'6.9547'	'0.0933'
b_\mu	'3.2968'	'15'	'6.0191'	'9.901'	'0.1069'
\mu	'0.0052'	'0.0203'	'0.06'	'0.0172'	'0.111'
a_H	'3.1236'	'8.3458'	'7.7052'	'3.828'	'0.1732'
b_H	'2.3621'	'9.7932'	'7.0837'	'5.3228'	'0.0717'
\nu	'17.9001'	'500'	'270.0084'	'473.3638'	'0.0909'
BP	'155.4584'	'159.664'	'157.5'	'155.5'	'0.0782'

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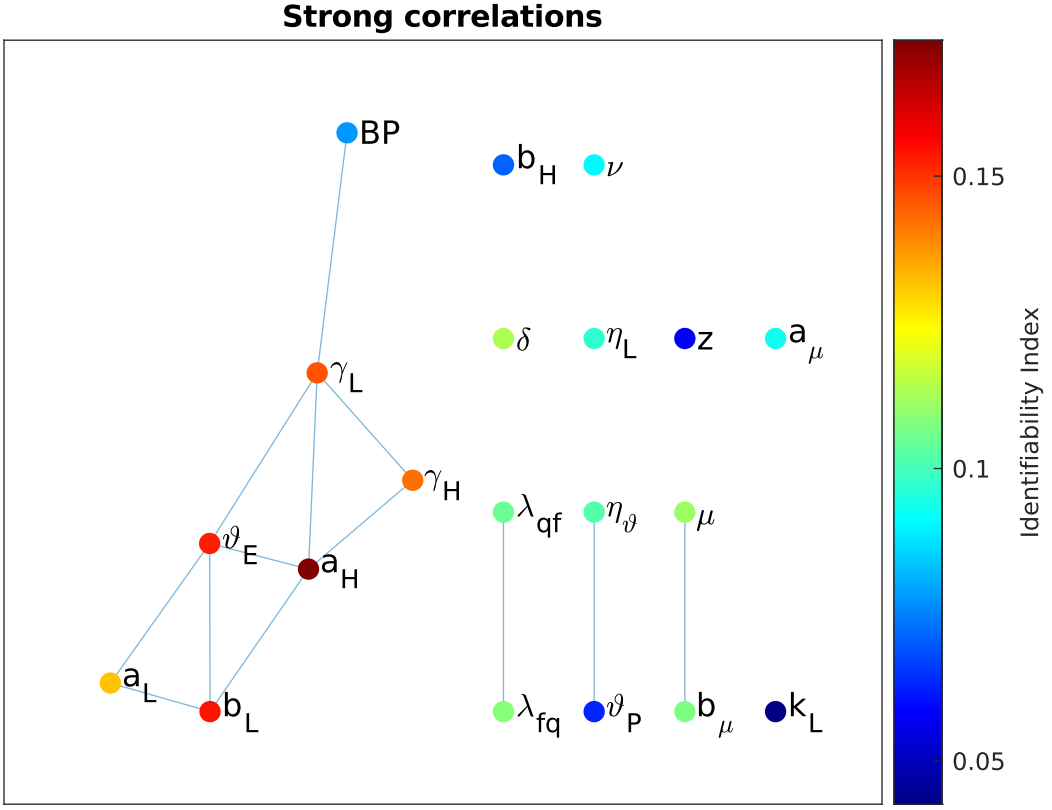
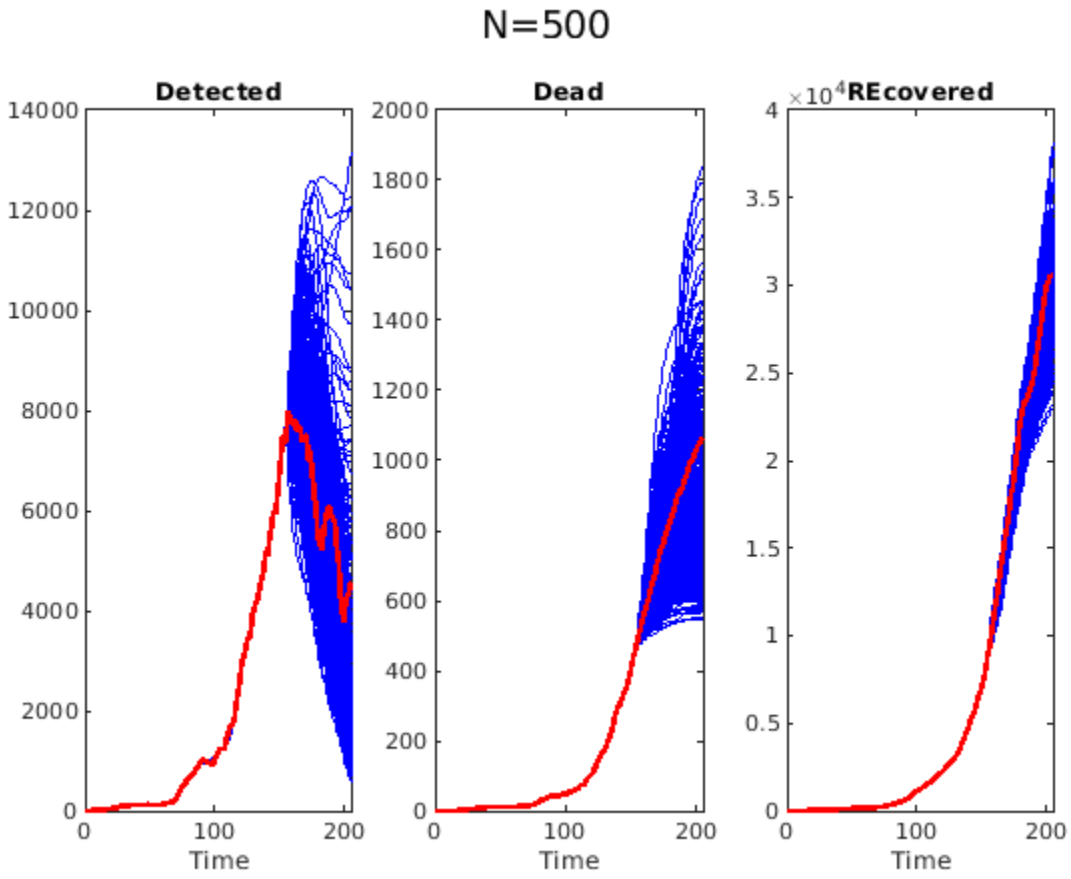
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
BP
b_H
ν
δ
η_L
z
a_μ
γ_L
γ_H
λ_{qf}
η_ϑ
μ
ϑ_E
a_H
a_L
b_L
λ_{fq}
ϑ_P
b_μ
k_L
0.15
0.1
0.05
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 data206 to the 251. The status of the validation is: COMPLETED.

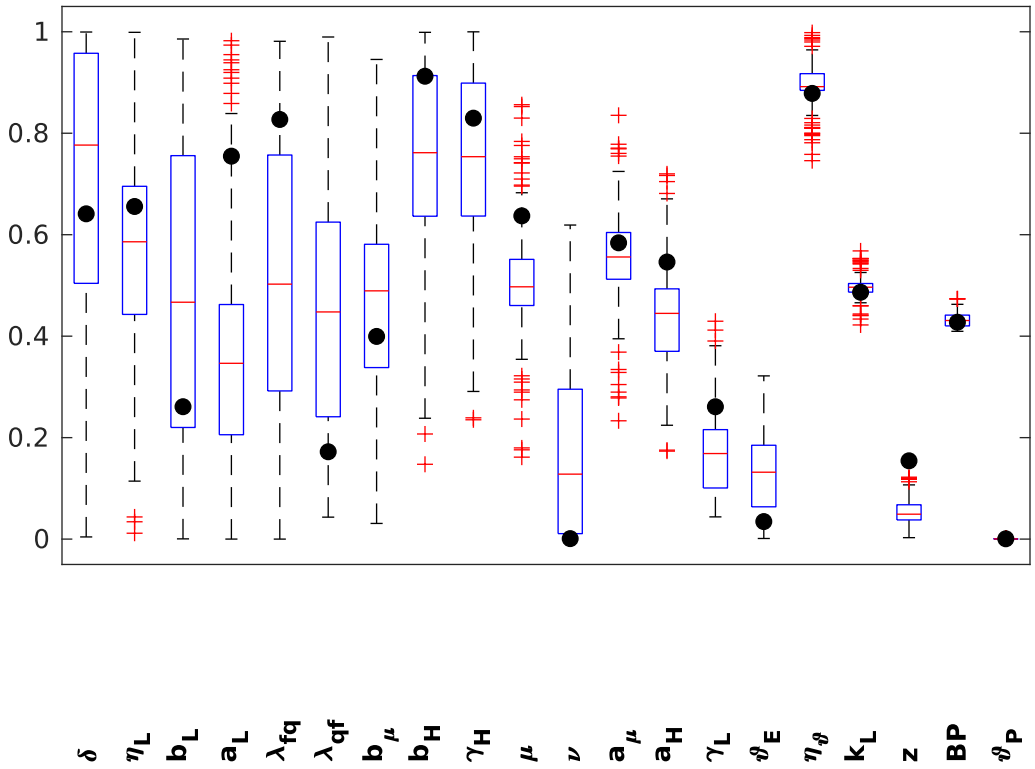
The number of estimations needed to perform the validation was1000.

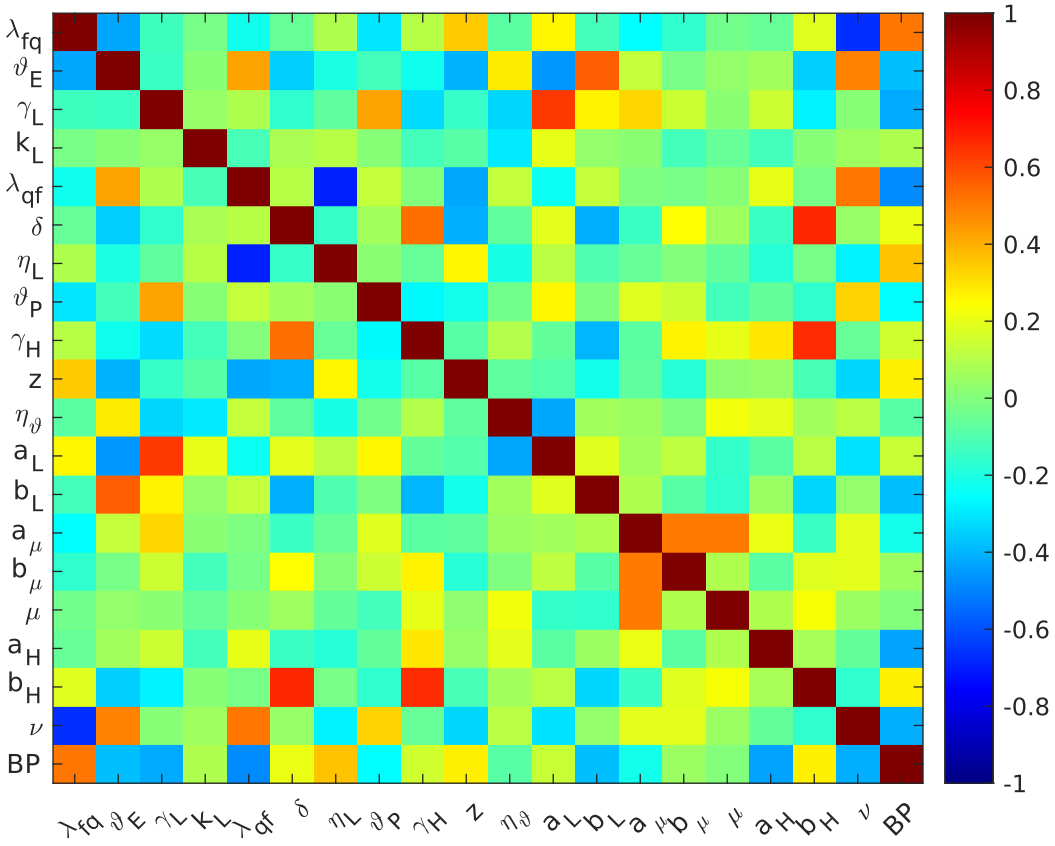
5.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4388'	'0.5664'	'0.5026'	'0.8271'	'0.1639'
\vartheta_E	'0.1138'	'0.1499'	'0.1319'	'0.0345'	'0.119'
\gamma_L	'0.1456'	'0.1916'	'0.1686'	'0.2609'	'0.1117'
k_L	'5.2013'	'5.7358'	'5.4685'	'5.3791'	'0.0746'
\lambda_{qf}	'0.3897'	'0.5059'	'0.4478'	'0.1721'	'0.1572'
\delta	'0.1058'	'0.1272'	'0.1165'	'0.0962'	'0.1723'
\eta_L	'0.5308'	'0.6413'	'0.586'	'0.6556'	'0.1303'
\vartheta_P	'0'	'0.0006'	'0.0003'	'0.0006'	'0.0641'
\gamma_H	'0.7058'	'0.8017'	'0.7538'	'0.8297'	'0.1473'
z	'0.5259'	'2.4203'	'1.4731'	'4.6301'	'0.104'
\eta_\vartheta	'0.8638'	'0.9199'	'0.8918'	'0.8785'	'0.088'
a_L	'4.8521'	'6.85'	'5.8511'	'11.5671'	'0.1599'
b_L	'6.4973'	'8.5762'	'7.5368'	'4.6535'	'0.1571'
a_\mu	'8.1859'	'9.3842'	'8.7851'	'9.1761'	'0.1329'
b_\mu	'7.1807'	'8.5205'	'7.8506'	'6.5931'	'0.1179'
\mu	'0.4474'	'0.5472'	'0.4973'	'0.6372'	'0.1138'
a_H	'6.807'	'7.6506'	'7.2288'	'8.6463'	'0.0871'
b_H	'10.9361'	'12.3894'	'11.6627'	'13.7728'	'0.1527'
\nu	'34.7383'	'93.3078'	'64.0231'	'0.4664'	'0.1622'
BP	'197.1677'	'197.8312'	'197.4995'	'197.1774'	'0.105'

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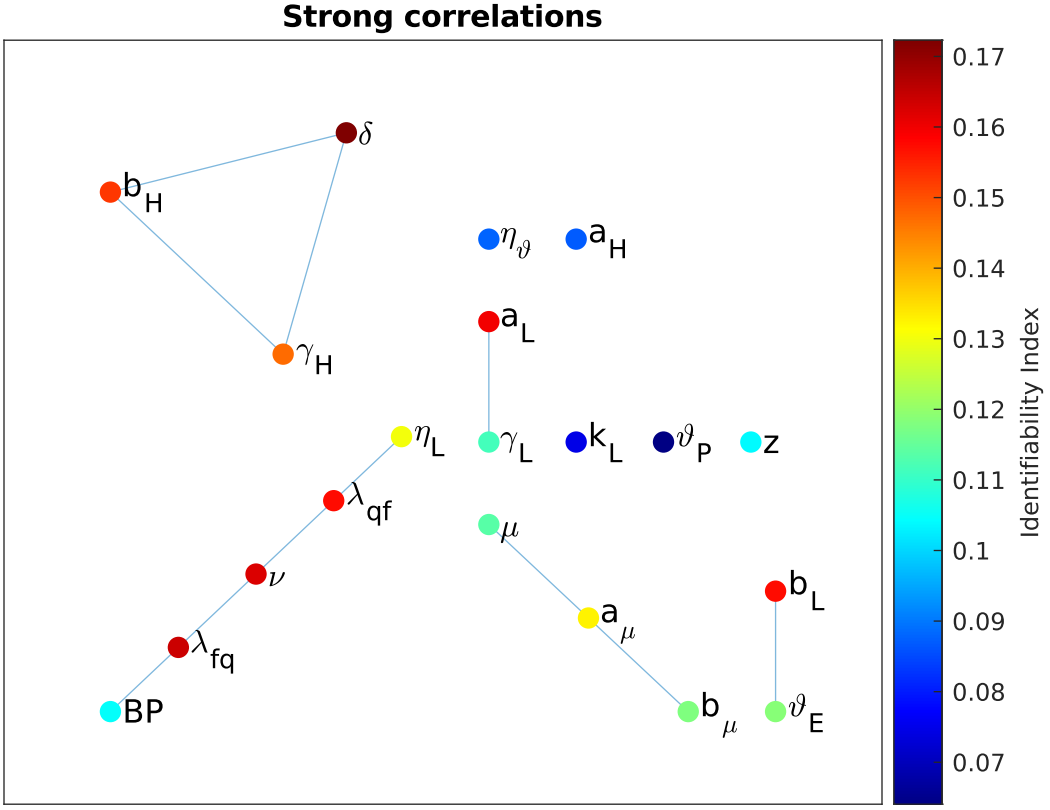
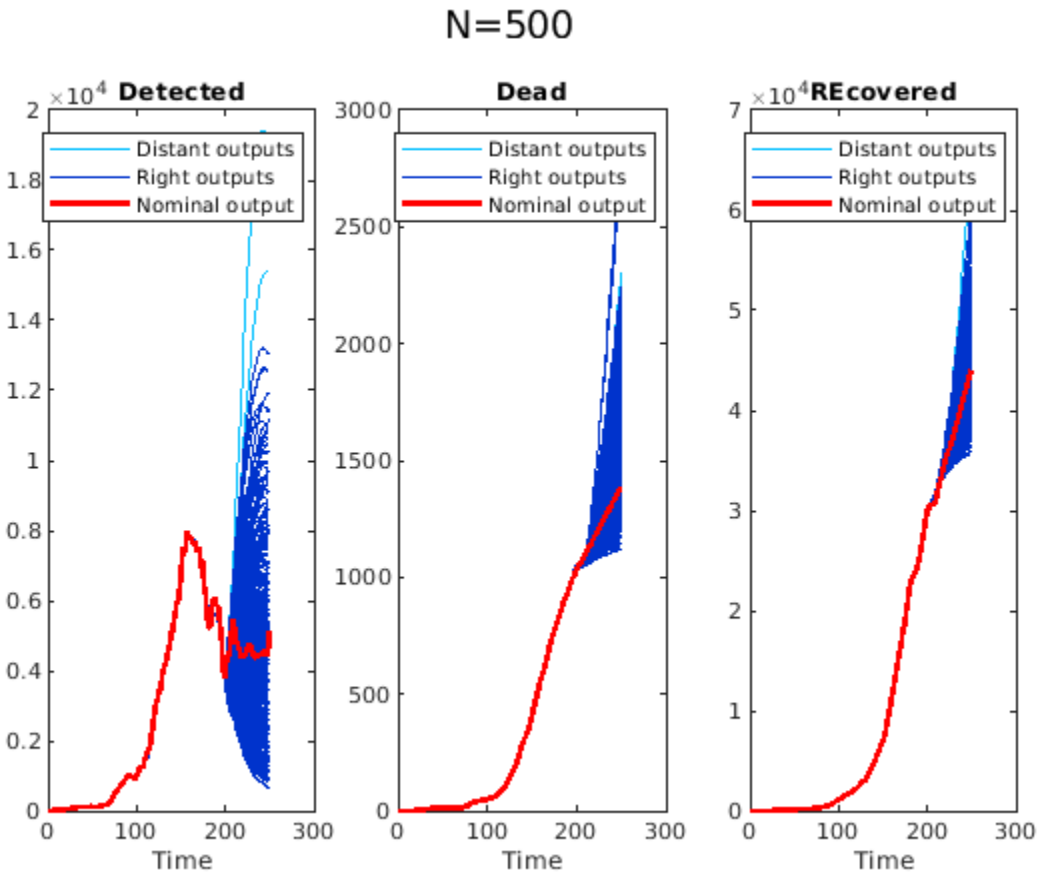
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
δ
b H
η ϑ
a H
a L
γ H
η L
γ L
k L
ϑ P
z
λ qf
μ
ν
b L
a μ
λ fq
BP
b μ
ϑ E
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
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 data251 to the 298. The status of the validation is: COMPLETED.

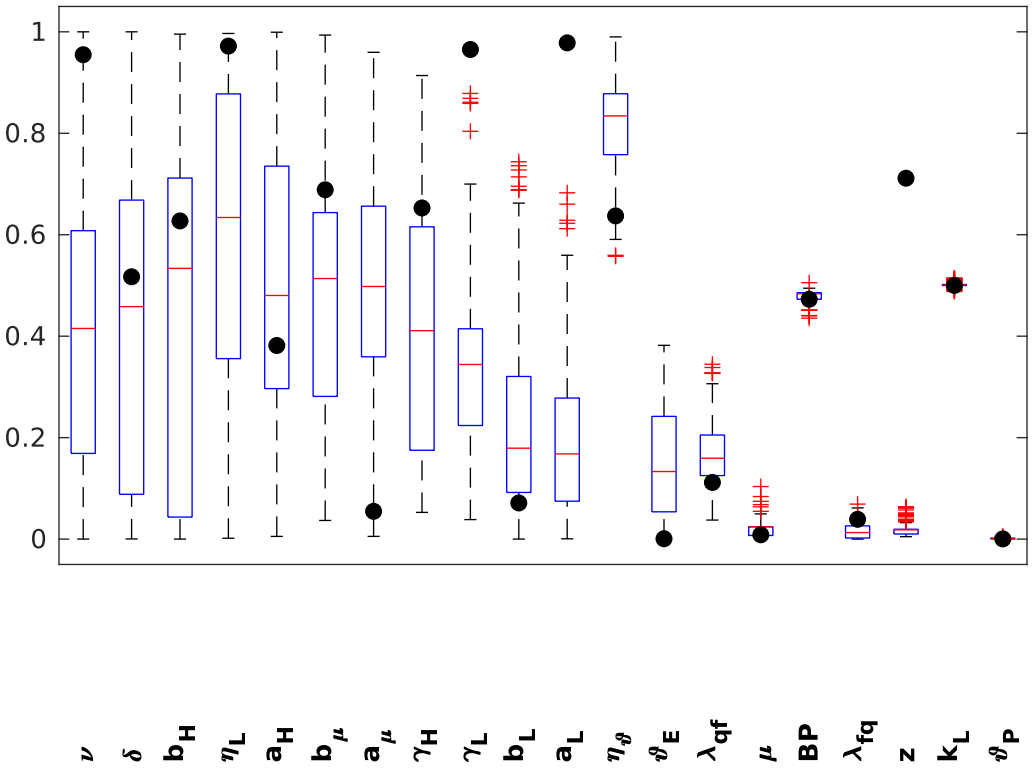
The number of estimations needed to perform the validation was1000.

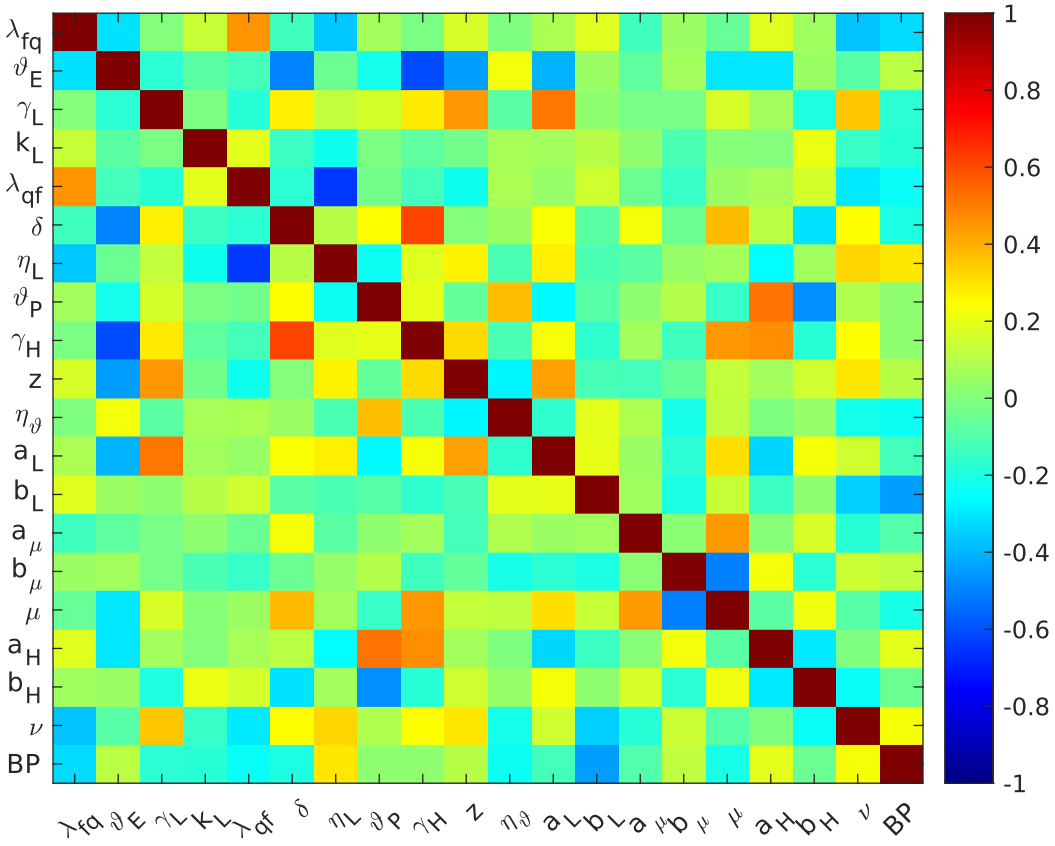
6.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0.0343'	'0.0129'	'0.039'	'0.0806'
\vartheta_E	'0.1093'	'0.157'	'0.1332'	'0.0007'	'0.1128'
\gamma_L	'0.2958'	'0.3926'	'0.3442'	'0.9652'	'0.1268'
k_L	'5.3258'	'5.6879'	'5.5068'	'5.5005'	'0.0676'
\lambda_{qf}	'0.1366'	'0.1824'	'0.1595'	'0.1117'	'0.103'
\delta	'0.0588'	'0.0787'	'0.0687'	'0.0776'	'0.1543'
\eta_L	'0.5741'	'0.6939'	'0.634'	'0.9718'	'0.1448'
\vartheta_P	'0.0003'	'0.0019'	'0.0011'	'0.0004'	'0.0798'
\gamma_H	'0.3585'	'0.4632'	'0.4109'	'0.6528'	'0.158'
z	'0'	'2.0454'	'0.5463'	'21.3421'	'0.1052'
\eta_\vartheta	'0.7992'	'0.8694'	'0.8343'	'0.6371'	'0.0928'
a_L	'2.5192'	'4.1836'	'3.3514'	'14.6956'	'0.1504'
b_L	'2.7638'	'4.2549'	'3.5093'	'1.9974'	'0.113'
a_\mu	'7.3573'	'8.5861'	'7.9717'	'1.7663'	'0.0928'
b_\mu	'7.5112'	'8.8713'	'8.1912'	'10.6409'	'0.1174'
\mu	'0'	'0.0725'	'0.0242'	'0.0085'	'0.1221'
a_H	'6.9148'	'8.5325'	'7.7236'	'6.343'	'0.1366'
b_H	'7.5234'	'9.4193'	'8.4714'	'9.7811'	'0.1336'
\nu	'178.0455'	'237.2053'	'207.6254'	'477.4398'	'0.1344'
BP	'250.2189'	'250.7766'	'250.4977'	'249.4998'	'0.0697'

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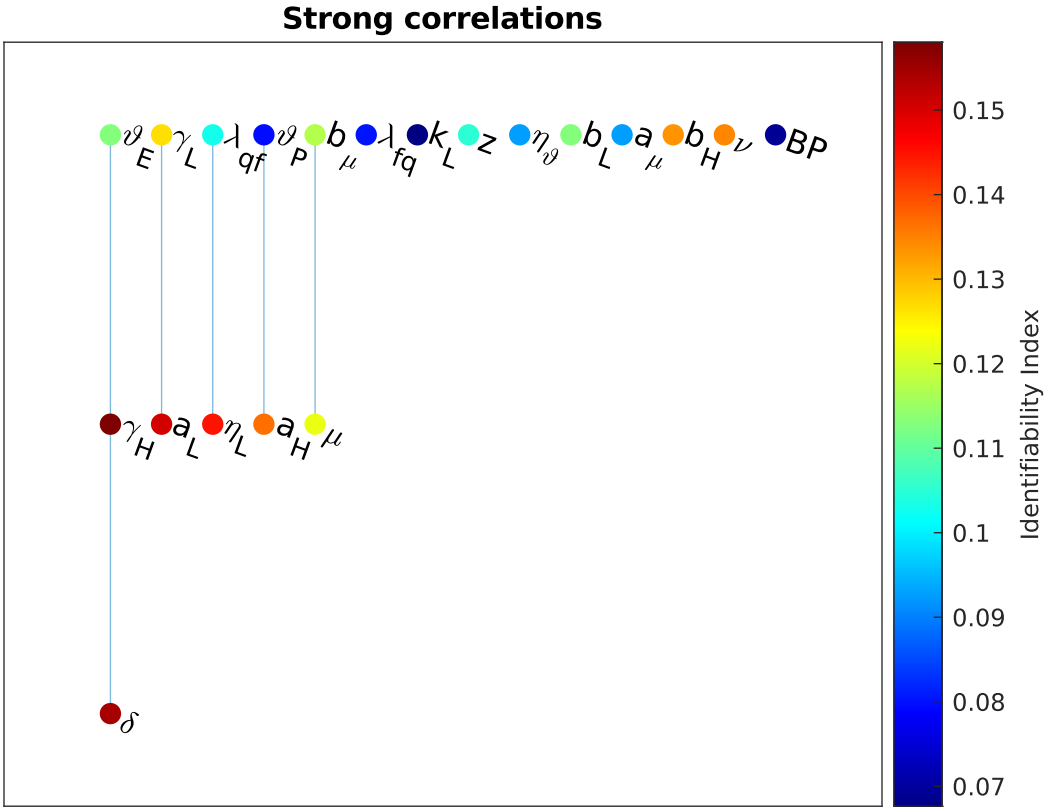
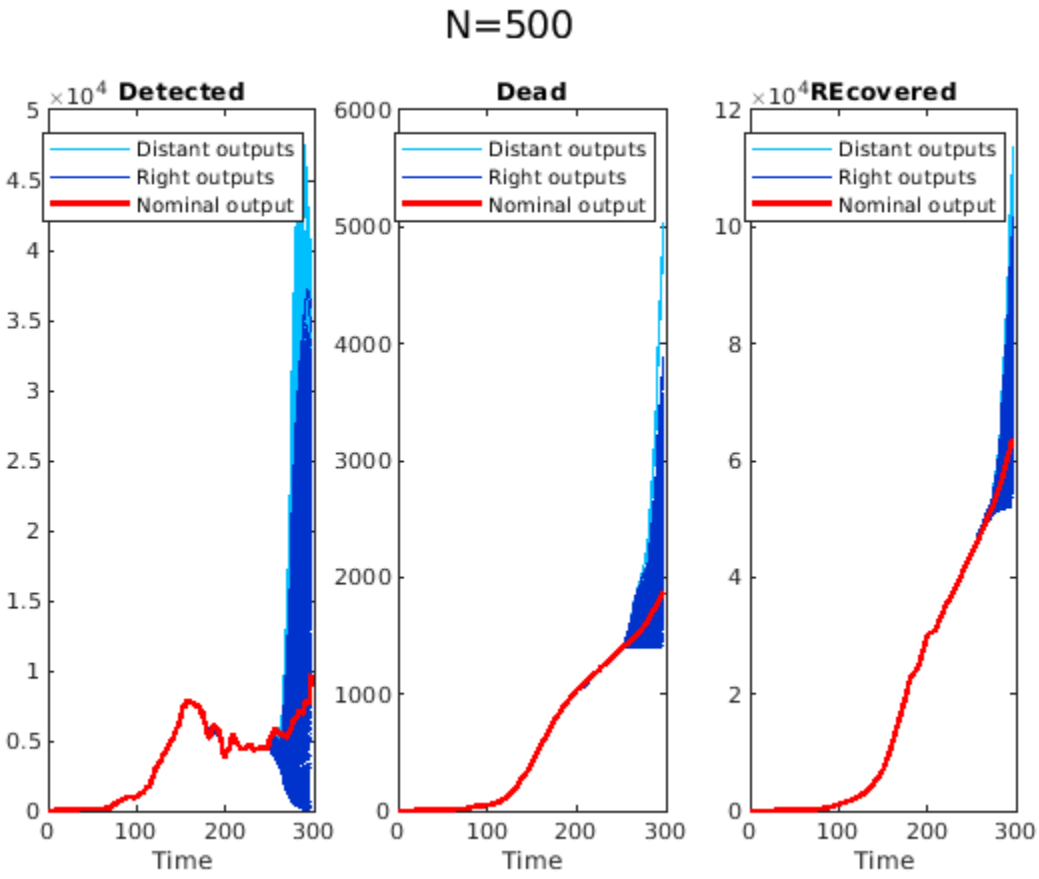
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07

6.4. Uncertainty analisys



Chapter 7. Extension number7

7.1. Basic information

The extension to be validated consists of the time series from the data298 to the 330. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

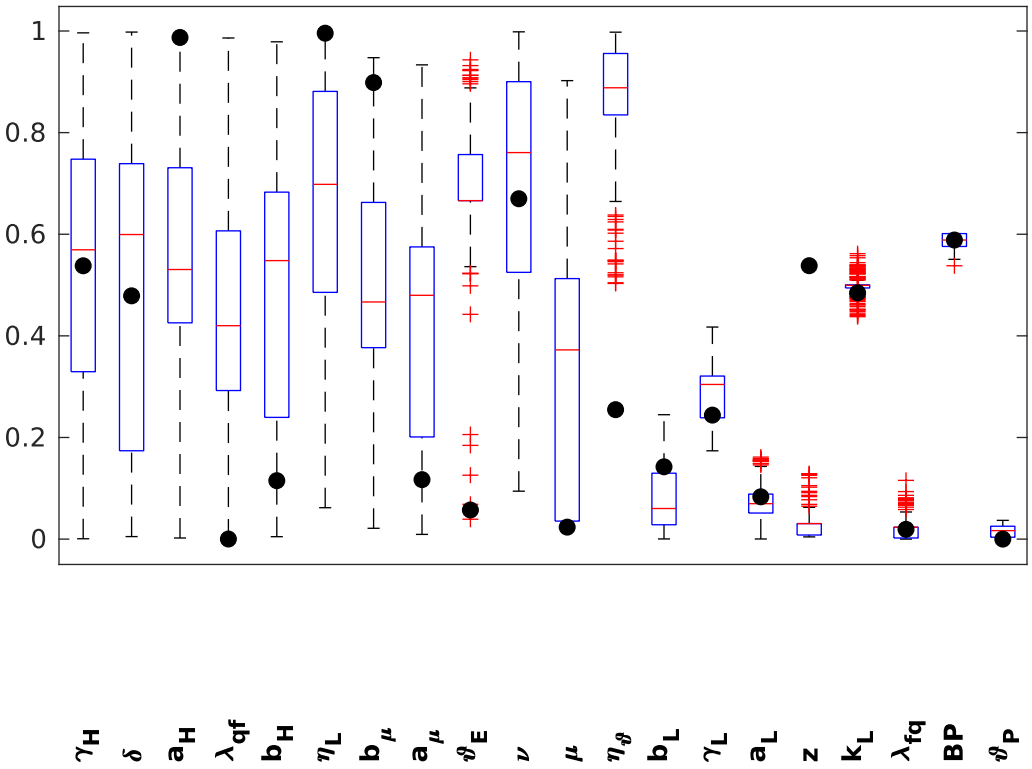
7.2. Estimated parameters with their intervals

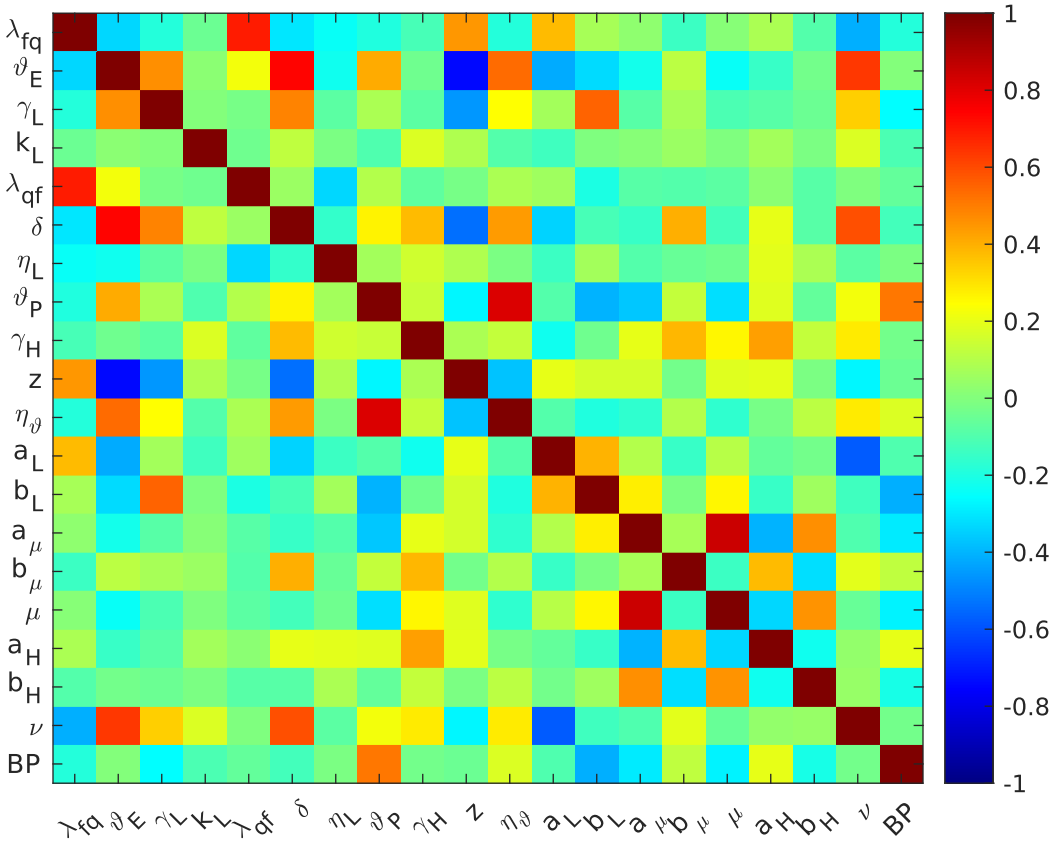
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

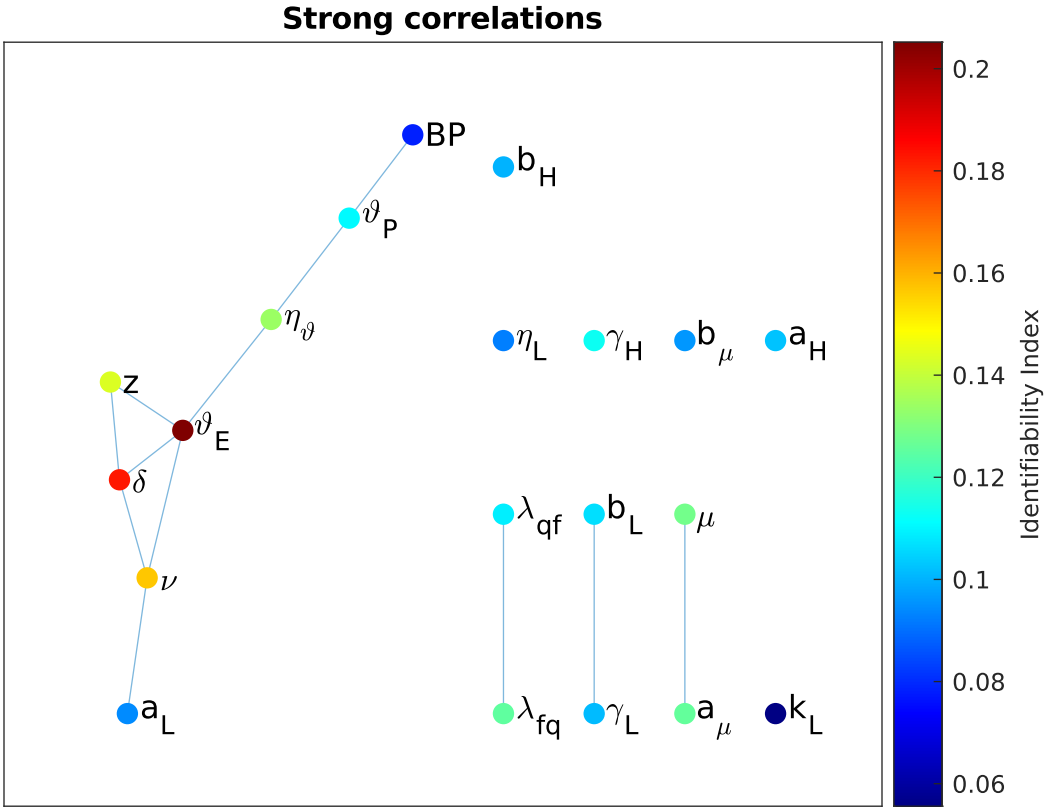
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0181'	'0.0314'	'0.0234'	'0.0192'	'0.1254'
\vartheta_E	'0.0129'	'0.119'	'0.6661'	'0.0573'	'0.2052'
\gamma_L	'0.2027'	'0.3057'	'0.3044'	'0.244'	'0.1017'
k_L	'1.5027'	'8.4928'	'5.495'	'5.3627'	'0.0556'
\lambda_{qf}	'0'	'0.0003'	'0.42'	'0.0001'	'0.109'
\delta	'0.0176'	'0.1242'	'0.0899'	'0.0718'	'0.1829'
\eta_L	'0.4294'	'1'	'0.6982'	'0.9957'	'0.0925'
\vartheta_P	'0'	'0'	'0.0166'	'0'	'0.1108'
\gamma_H	'0'	'0.7486'	'0.5694'	'0.5379'	'0.1131'
z	'10.0446'	'24.2457'	'0.9149'	'16.1431'	'0.1434'
\eta_\vartheta	'0.2527'	'0.2913'	'0.8883'	'0.2547'	'0.1342'
a_L	'2.0258'	'3.4017'	'1.976'	'2.1655'	'0.0947'
b_L	'1.7425'	'3.7739'	'1.8429'	'2.9921'	'0.1068'
a_\mu	'1.7929'	'12.748'	'7.7175'	'2.6382'	'0.1262'
b_\mu	'1.8288'	'15'	'7.534'	'13.5788'	'0.0963'
\mu	'0.0054'	'0.051'	'0.3724'	'0.0236'	'0.1283'
a_H	'3.5551'	'15'	'8.4283'	'14.8218'	'0.1024'
b_H	'1'	'14.44'	'8.6735'	'2.6102'	'0.1003'
\nu	'301.0855'	'367.8136'	'380.3558'	'334.9275'	'0.1572'
BP	'297.0118'	'301.852'	'297.5'	'297.5'	'0.0788'

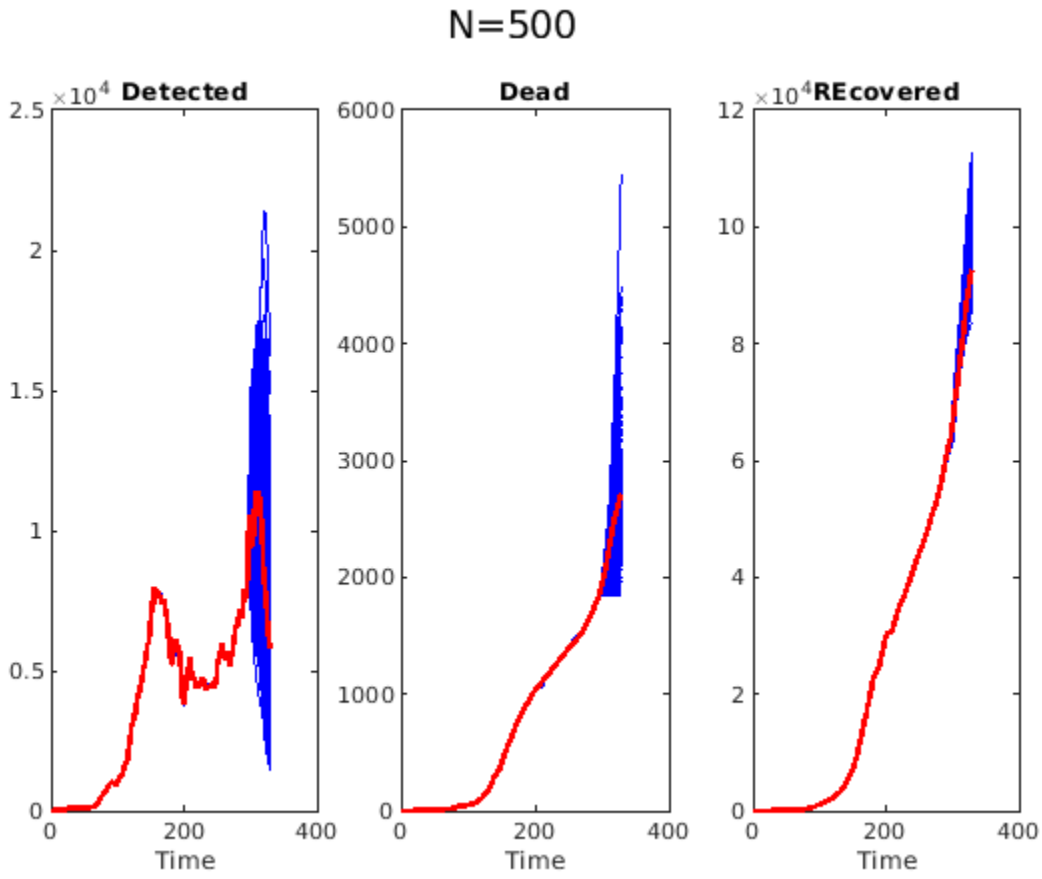
7.3. Identifiability analisys




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


Strong correlations
BP
b_H
ϑ_P
η_ϑ
η_L
γ_H
b_μ
a_H
z
ϑ_E
δ
λ_{qf}
b_L
μ
ν
a_L
λ_{fq}
γ_L
a_μ
k_L
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
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 data330 to the 358. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

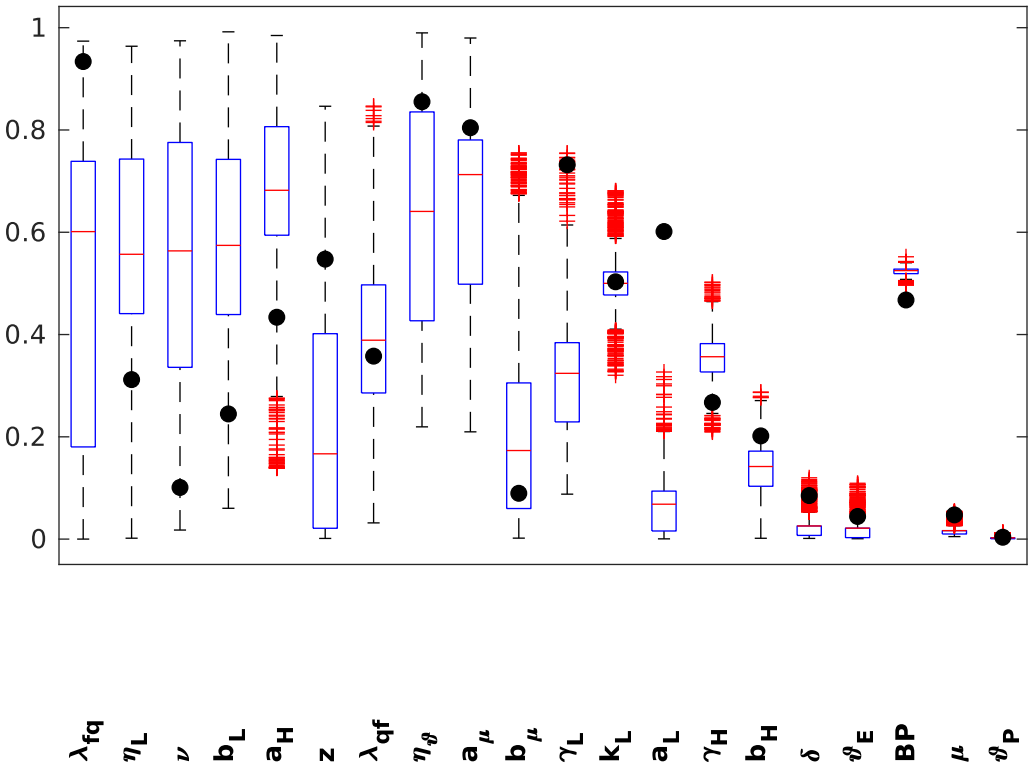
8.2. Estimated parameters with their intervals

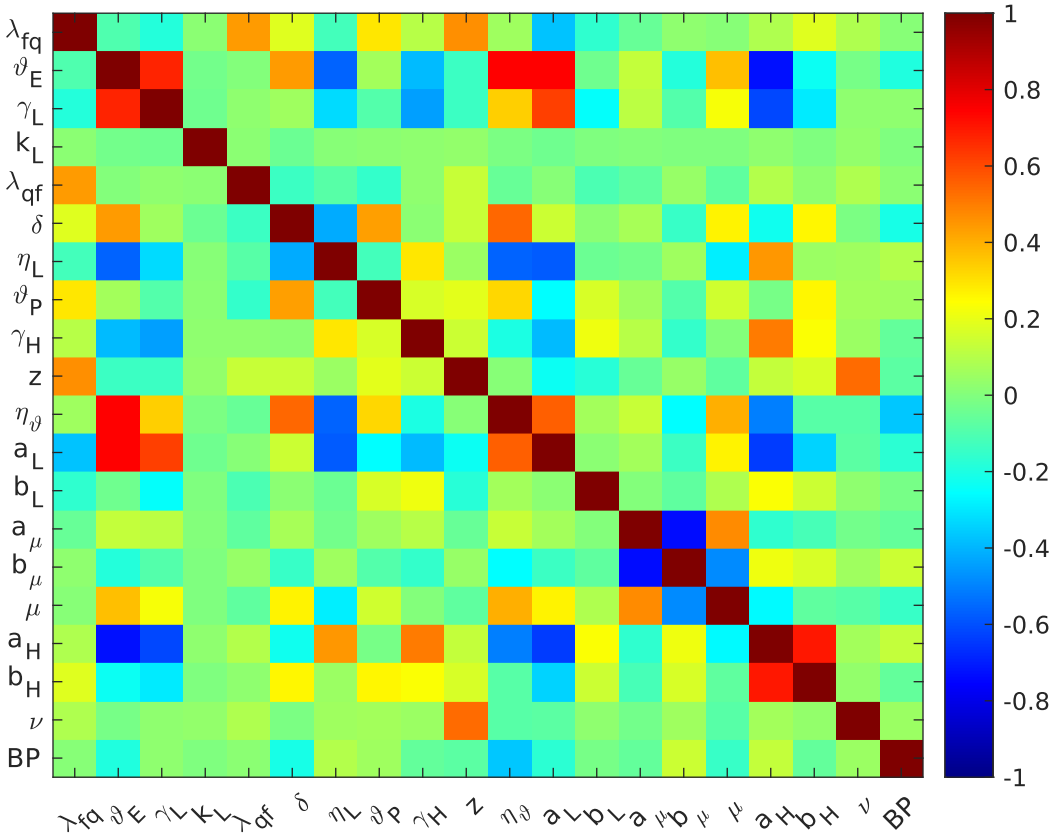
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.6537'	'0.9827'	'0.6013'	'0.9338'	'0.0862'
\vartheta_E	'0.0081'	'0.0873'	'0.0214'	'0.0443'	'0.1749'
\gamma_L	'0.1457'	'0.8563'	'0.3241'	'0.7319'	'0.1366'
k_L	'1'	'10'	'5.5011'	'5.5283'	'0.0389'
\lambda_{qf}	'0.0686'	'0.3775'	'0.3889'	'0.3578'	'0.0571'
\delta	'0'	'0.0287'	'0.0039'	'0.0128'	'0.0978'
\eta_L	'0.0133'	'0.6091'	'0.5569'	'0.3119'	'0.1323'
\vartheta_P	'0.0015'	'0.0068'	'0.0025'	'0.0036'	'0.0634'
\gamma_H	'0.216'	'0.931'	'0.3566'	'0.2673'	'0.0887'
z	'2.3144'	'20.5096'	'5.0033'	'16.4232'	'0.0909'
\eta_\vartheta	'0.801'	'0.9895'	'0.6407'	'0.8552'	'0.1708'
a_L	'8.9851'	'14.4256'	'1.9553'	'9.4198'	'0.1816'
b_L	'1.5868'	'4.5776'	'9.0408'	'4.4264'	'0.063'
a_\mu	'2.1527'	'15'	'10.9788'	'12.2618'	'0.0852'
b_\mu	'1.28'	'15'	'3.4248'	'2.254'	'0.0992'
\mu	'0'	'0.065'	'0.0166'	'0.0473'	'0.078'
a_H	'7.0181'	'15'	'10.549'	'7.0734'	'0.1905'
b_H	'1.4833'	'9.5025'	'2.9872'	'3.8257'	'0.0848'
\nu	'42.1564'	'143.4748'	'281.7868'	'50.4866'	'0.0768'
BP	'325.6476'	'332.7475'	'329.5'	'326.0536'	'0.0501'

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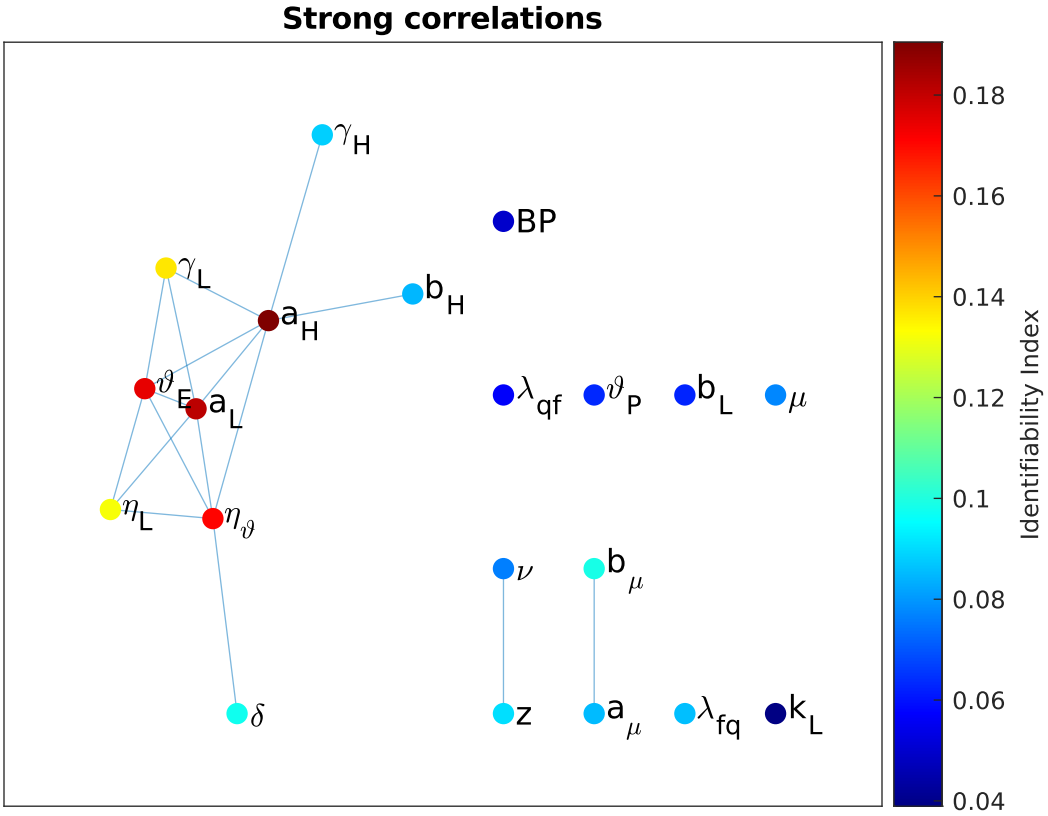
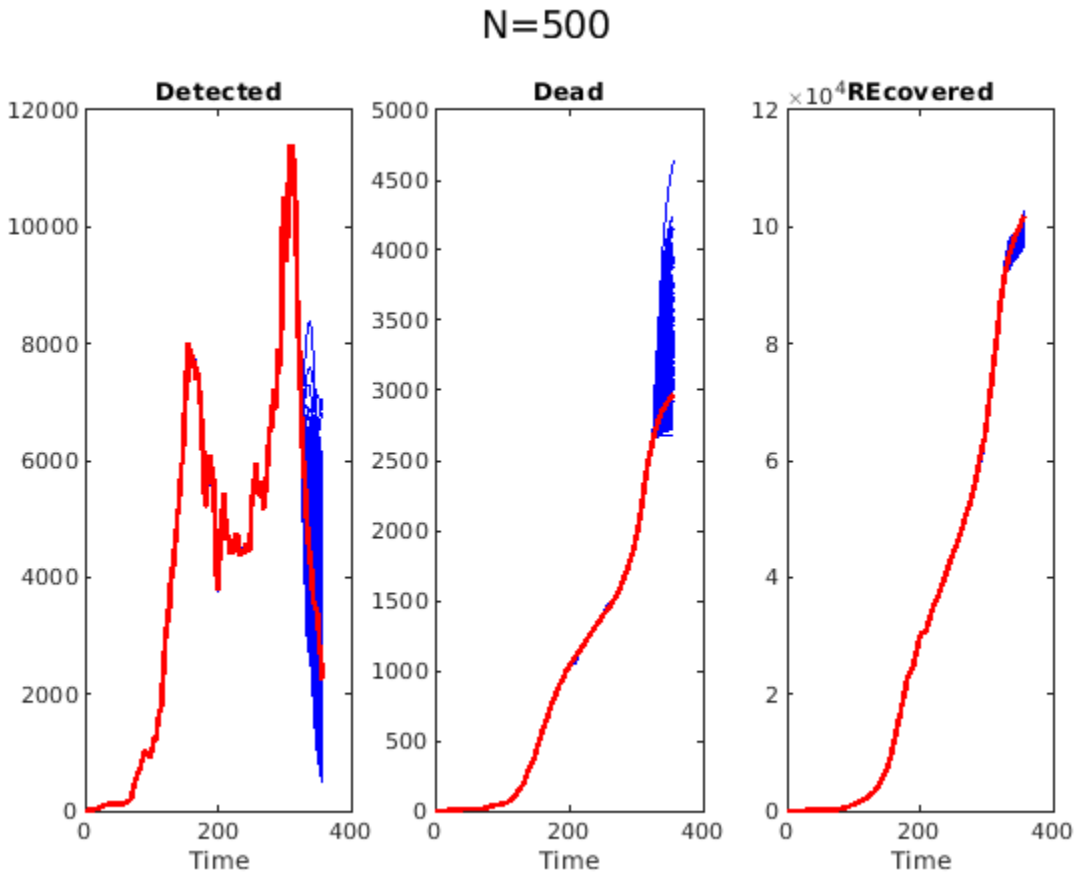
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
γ_H
BP
γ_L
b_H
a_H
ϑ_E
a_L
λ_{qf}
ϑ_P
b_L
μ
η_L
η_ϑ
ν
b_μ
δ
z
a_μ
λ_{fq}
k_L
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
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 data358 to the 383. The status of the validation is: COMPLETED.

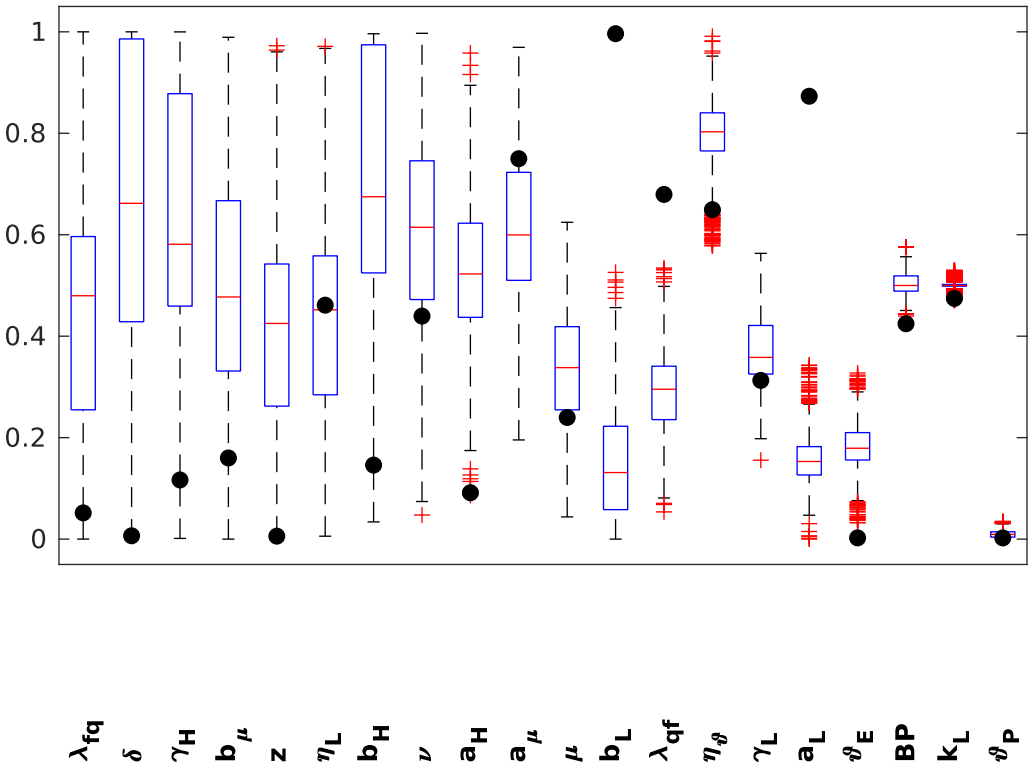
The number of estimations needed to perform the validation was1000.

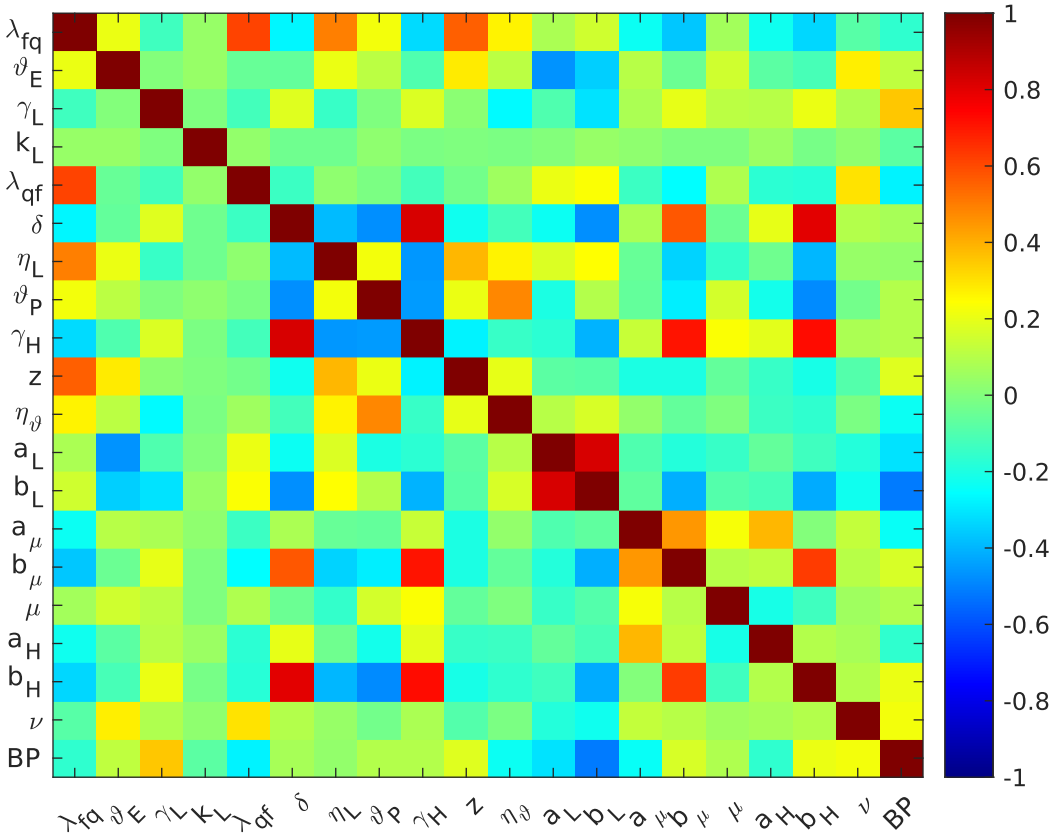
9.2. Estimated parameters with their intervals

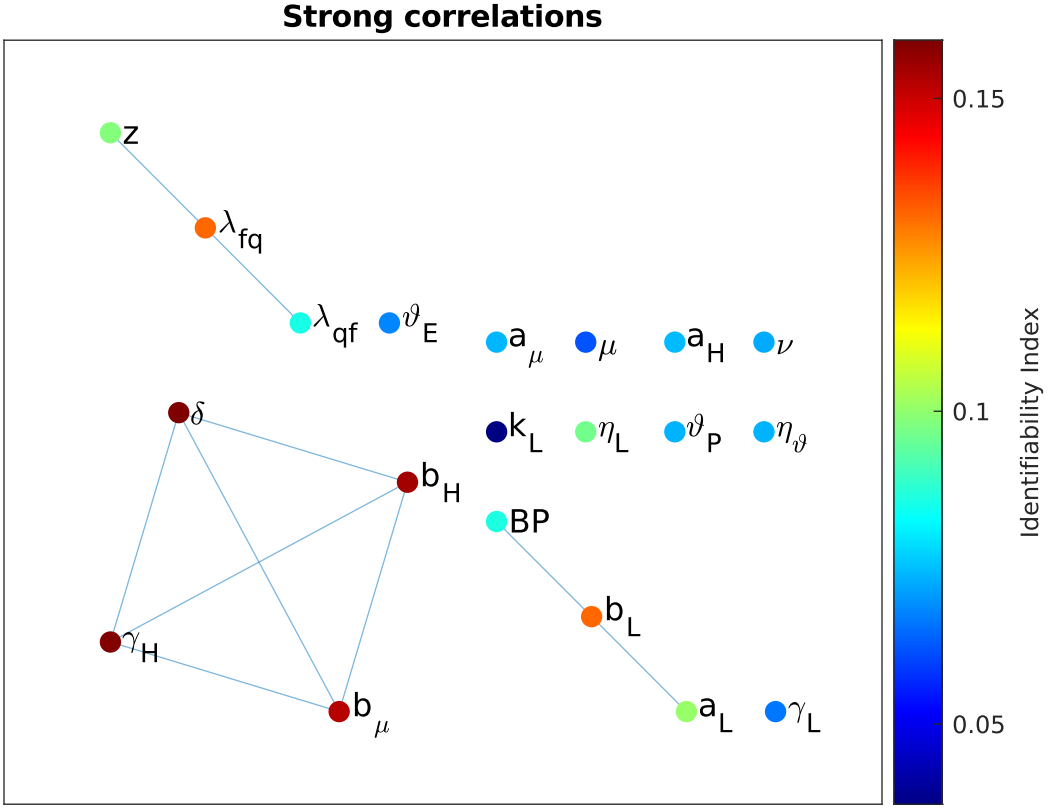
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4587'	'0.5008'	'0.4797'	'0.0517'	'0.1312'
\vartheta_E	'0.1716'	'0.1866'	'0.1791'	'0.0024'	'0.0684'
\gamma_L	'0.3491'	'0.3674'	'0.3582'	'0.3128'	'0.0668'
k_L	'5.4482'	'5.5536'	'5.5009'	'5.2699'	'0.0372'
\lambda_{qf}	'0.2852'	'0.3057'	'0.2954'	'0.6794'	'0.0857'
\delta	'0.0947'	'0.1039'	'0.0993'	'0.001'	'0.1593'
\eta_L	'0.4319'	'0.4721'	'0.452'	'0.4612'	'0.0964'
\vartheta_P	'0.0084'	'0.0103'	'0.0093'	'0.0023'	'0.0738'
\gamma_H	'0.5555'	'0.6068'	'0.5812'	'0.1166'	'0.1584'
z	'12.204'	'13.3014'	'12.7527'	'0.1739'	'0.0986'
\eta_\vartheta	'0.7897'	'0.816'	'0.8028'	'0.6494'	'0.0737'
a_L	'2.9077'	'3.379'	'3.1433'	'13.2225'	'0.1011'
b_L	'2.6067'	'3.0678'	'2.8372'	'14.9485'	'0.1315'
a_\mu	'9.1877'	'9.5965'	'9.3921'	'11.4989'	'0.0741'
b_\mu	'7.3377'	'8.0267'	'7.6822'	'3.2393'	'0.1522'
\mu	'0.3273'	'0.3488'	'0.3381'	'0.2397'	'0.0622'
a_H	'8.1095'	'8.526'	'8.3178'	'2.2796'	'0.0745'
b_H	'10.0862'	'10.8107'	'10.4485'	'3.0429'	'0.155'
\nu	'297.4611'	'317.2248'	'307.3429'	'219.7782'	'0.0725'
BP	'356.3097'	'356.6903'	'356.5'	'352.5'	'0.0861'

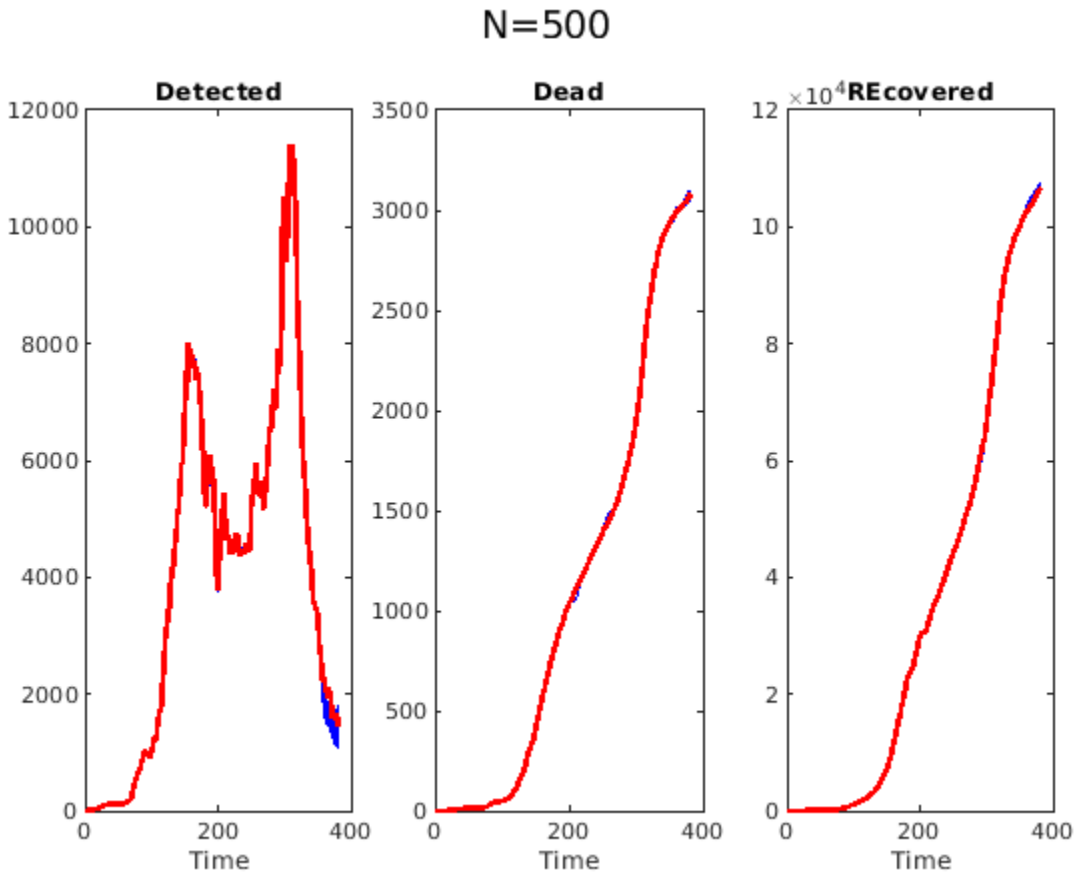
9.3. Identifiability analisys




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
z
λ_{fq}
λ_{qf}
ϑ_E
a_μ
μ
a_H
ν
k_L
η_L
ϑ_P
η_ϑ
δ
b_H
BP
b_L
γ_H
b_μ
a_L
γ_L
0.15
0.1
0.05
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 data383 to the 435. The status of the validation is: COMPLETED.

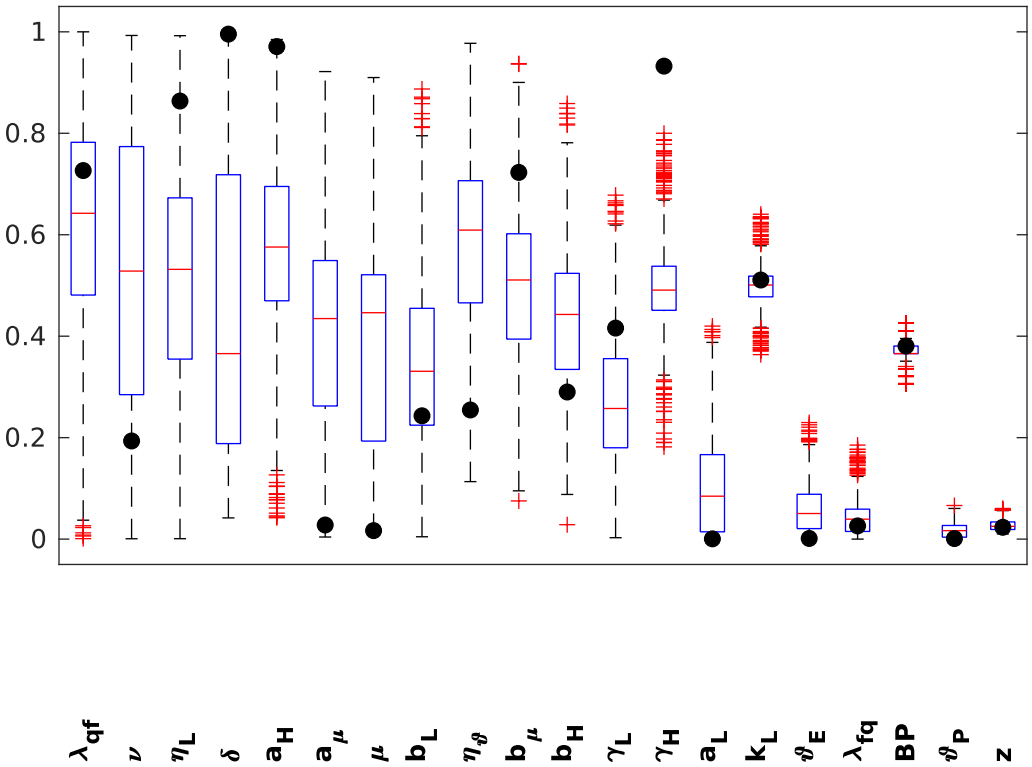
The number of estimations needed to perform the validation was1000.

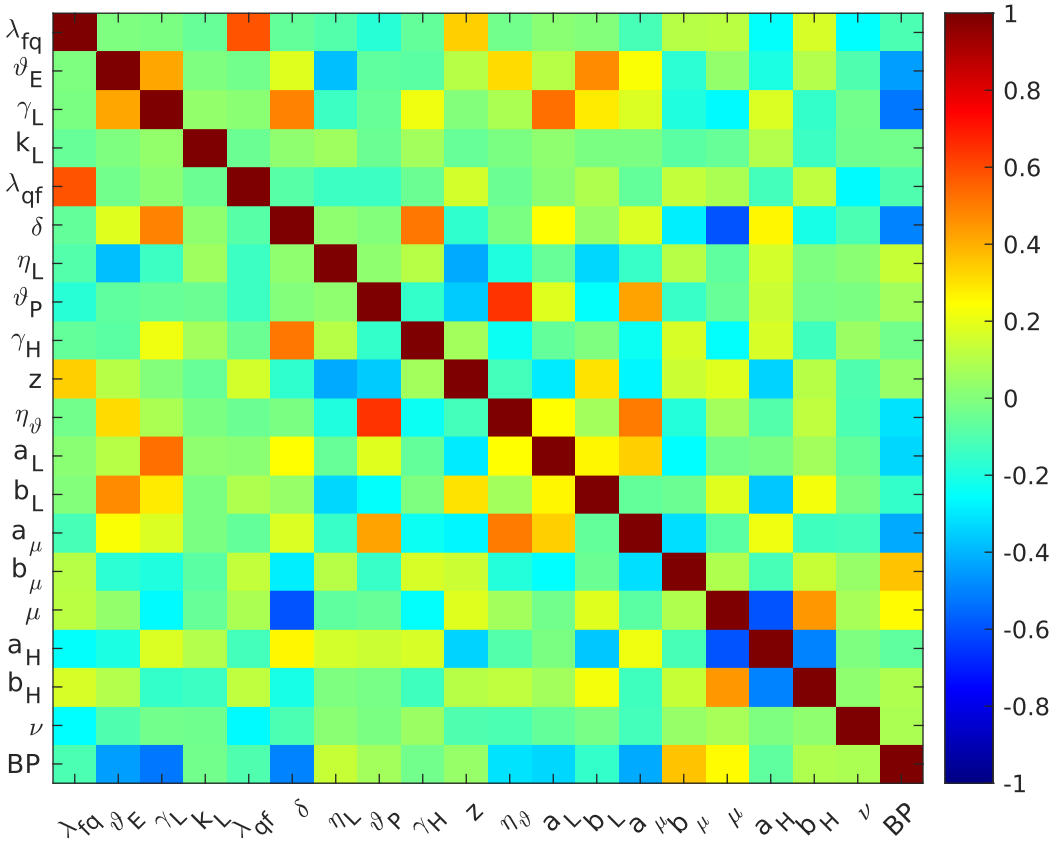
10.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0025'	'0.0762'	'0.0394'	'0.026'	'0.1059'
\vartheta_E	'0.0401'	'0.0612'	'0.0507'	'0.0013'	'0.0785'
\gamma_L	'0.2295'	'0.2857'	'0.2576'	'0.416'	'0.1252'
k_L	'5.3917'	'5.6238'	'5.5078'	'5.5966'	'0.0486'
\lambda_{qf}	'0.6124'	'0.6722'	'0.6423'	'0.7265'	'0.0954'
\delta	'0.0491'	'0.0606'	'0.0548'	'0.1493'	'0.1375'
\eta_L	'0.5017'	'0.5618'	'0.5317'	'0.8636'	'0.0871'
\vartheta_P	'0.0147'	'0.0186'	'0.0167'	'0.0011'	'0.0763'
\gamma_H	'0.4688'	'0.5129'	'0.4908'	'0.9324'	'0.0921'
z	'0.6712'	'0.8356'	'0.7534'	'0.6985'	'0.0721'
\eta_\vartheta	'0.5866'	'0.6318'	'0.6092'	'0.2545'	'0.1148'
a_L	'1.8892'	'2.5011'	'2.1951'	'1.0071'	'0.0985'
b_L	'5.1942'	'6.0944'	'5.6443'	'4.4031'	'0.0968'
a_\mu	'6.7297'	'7.4431'	'7.0864'	'1.3892'	'0.1133'
b_\mu	'7.8437'	'8.4589'	'8.1513'	'11.1202'	'0.0853'
\mu	'0.419'	'0.4737'	'0.4464'	'0.0167'	'0.1208'
a_H	'8.6667'	'9.4463'	'9.0565'	'14.592'	'0.1137'
b_H	'6.9286'	'7.4771'	'7.2029'	'5.0594'	'0.0807'
\nu	'246.9319'	'281.432'	'264.182'	'96.7275'	'0.0782'
BP	'382.2103'	'382.7897'	'382.5'	'383.4999'	'0.0921'

10.3. 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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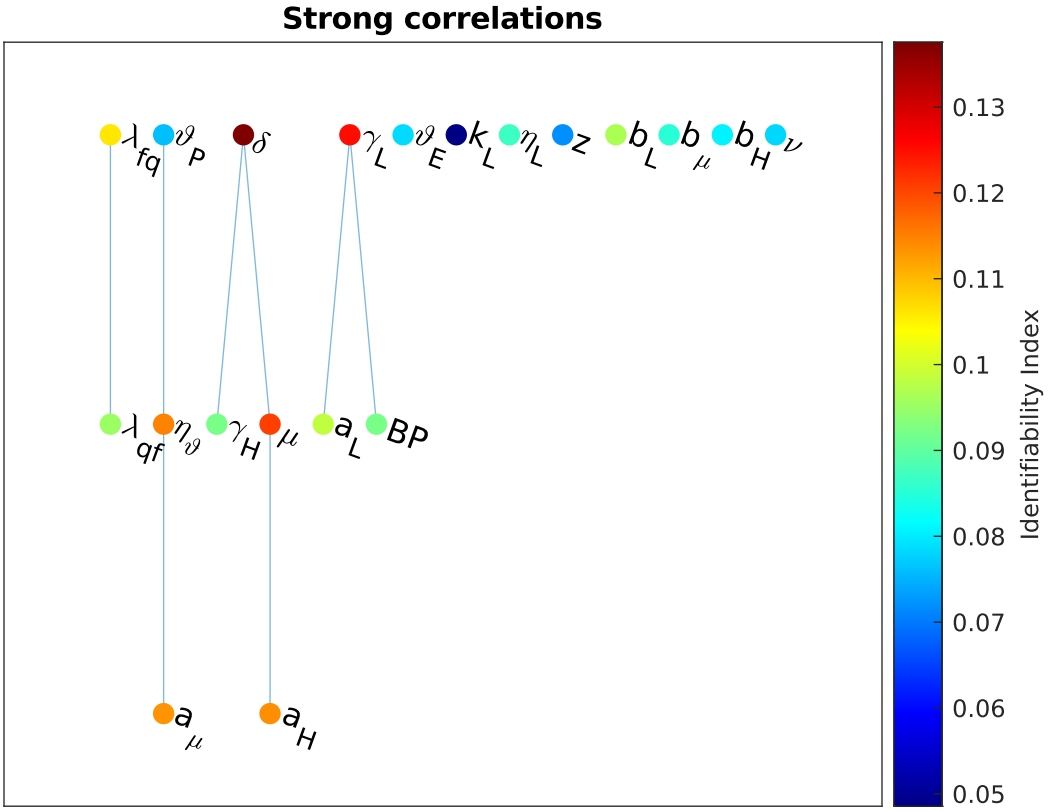
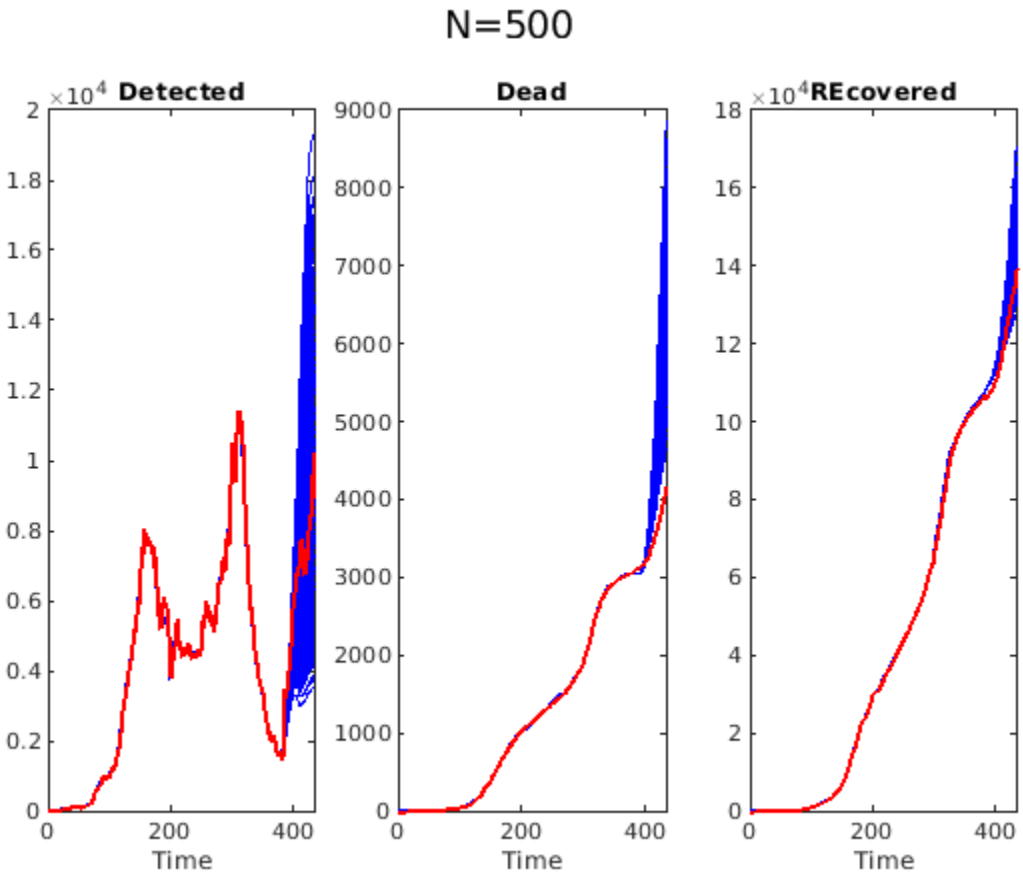
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


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

10.4. Uncertainty analisys



Chapter 11. Extension number11

11.1. Basic information

The extension to be validated consists of the time series from the data435 to the 456. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

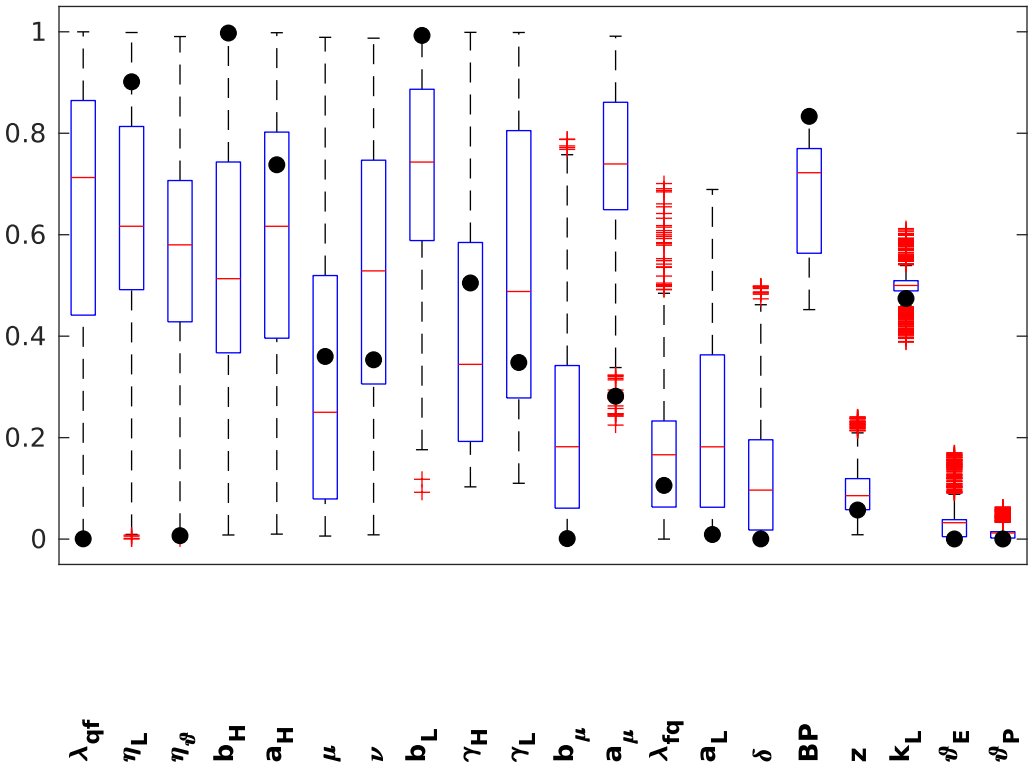
11.2. Estimated parameters with their intervals

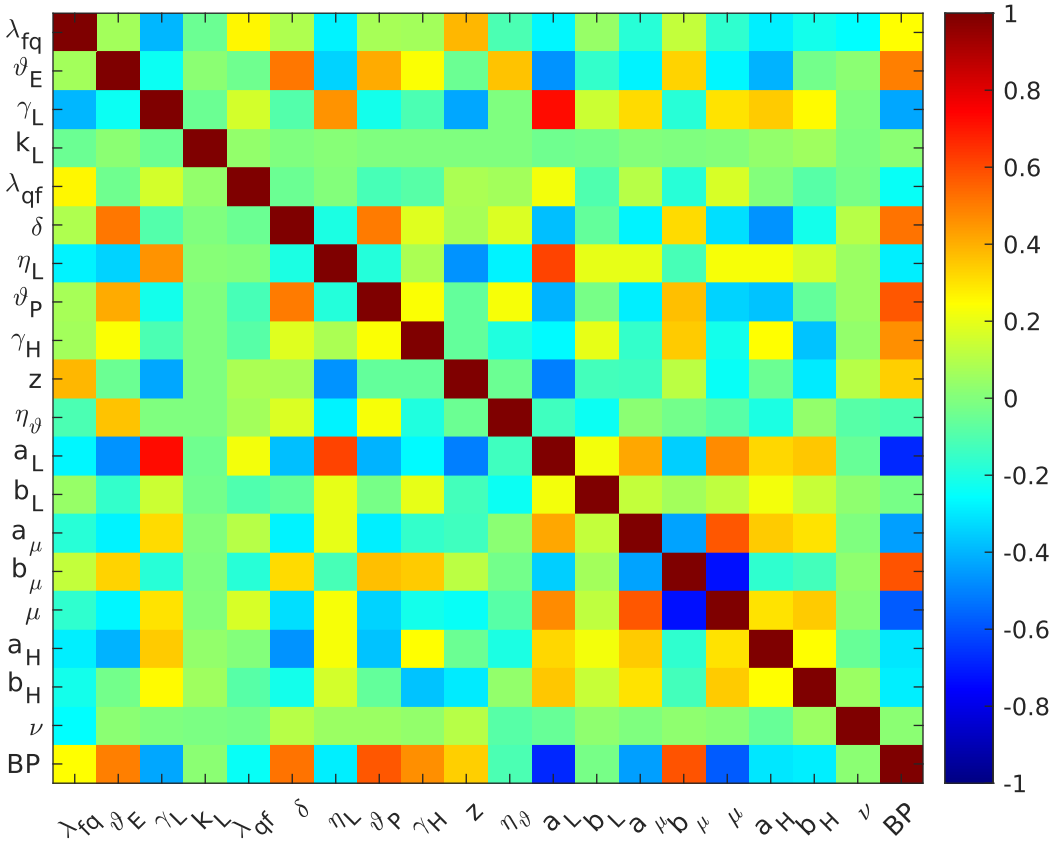
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

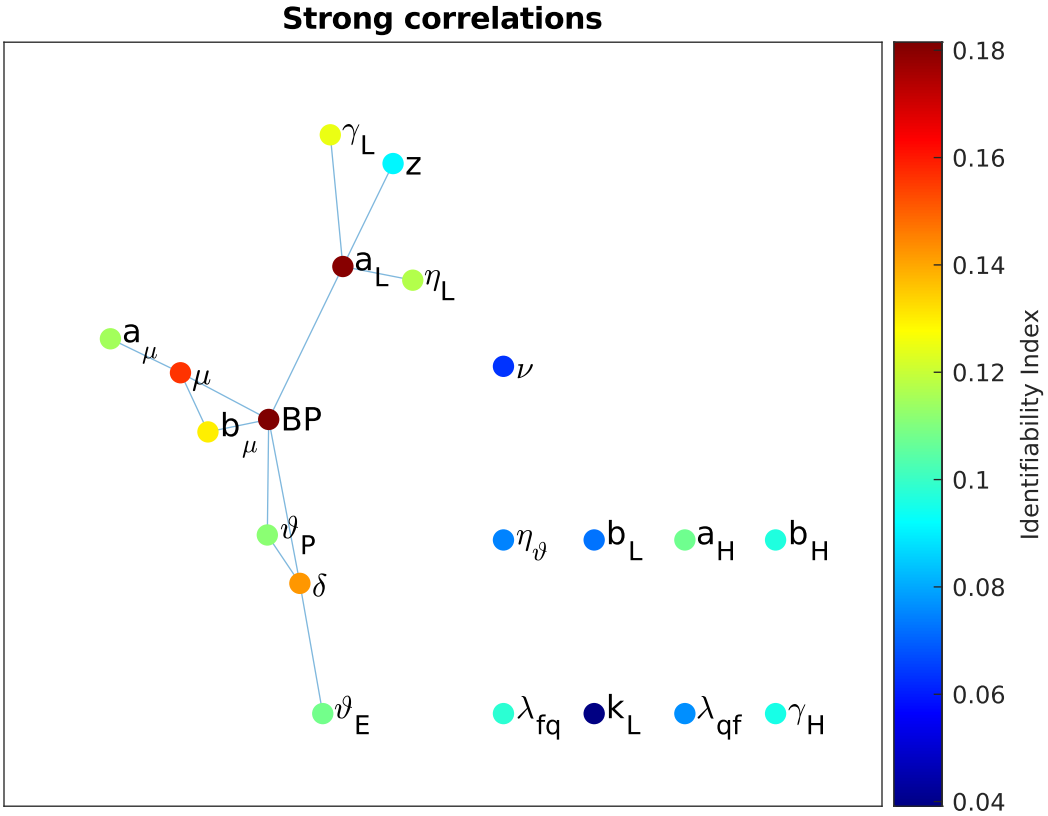
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0563'	'0.9528'	'0.1662'	'0.1058'	'0.0985'
\vartheta_E	'0'	'0.0006'	'0.0323'	'0.0003'	'0.1085'
\gamma_L	'0.2583'	'0.3495'	'0.4881'	'0.3481'	'0.1253'
k_L	'1'	'10'	'5.4997'	'5.269'	'0.0391'
\lambda_{qf}	'0'	'0.0012'	'0.7127'	'0.0005'	'0.0766'
\delta	'0'	'0.0001'	'0.0145'	'0.0001'	'0.1421'
\eta_L	'0.02'	'1'	'0.6167'	'0.9015'	'0.1175'
\vartheta_P	'0'	'0.0005'	'0.012'	'0.0002'	'0.1115'
\gamma_H	'0.139'	'1'	'0.3445'	'0.5049'	'0.0959'
z	'0.2463'	'3.8719'	'2.568'	'1.7208'	'0.0909'
\eta_\vartheta	'0'	'0.0152'	'0.58'	'0.0067'	'0.0753'
a_L	'1.0206'	'1.7442'	'3.5466'	'1.1269'	'0.18'
b_L	'9.6209'	'15'	'11.405'	'14.8999'	'0.0727'
a_\mu	'4.6552'	'8.3151'	'11.3525'	'4.9428'	'0.1152'
b_\mu	'1'	'2.4411'	'3.549'	'1.0143'	'0.13'
\mu	'0'	'0.6316'	'0.25'	'0.36'	'0.1564'
a_H	'4.1536'	'14.4472'	'9.6325'	'11.3303'	'0.1078'
b_H	'3.2707'	'15'	'8.1868'	'14.9655'	'0.0966'
\nu	'9.9412'	'397.6461'	'264.3453'	'176.7316'	'0.0636'
BP	'435.2233'	'440.3555'	'428.5'	'435.5'	'0.1815'

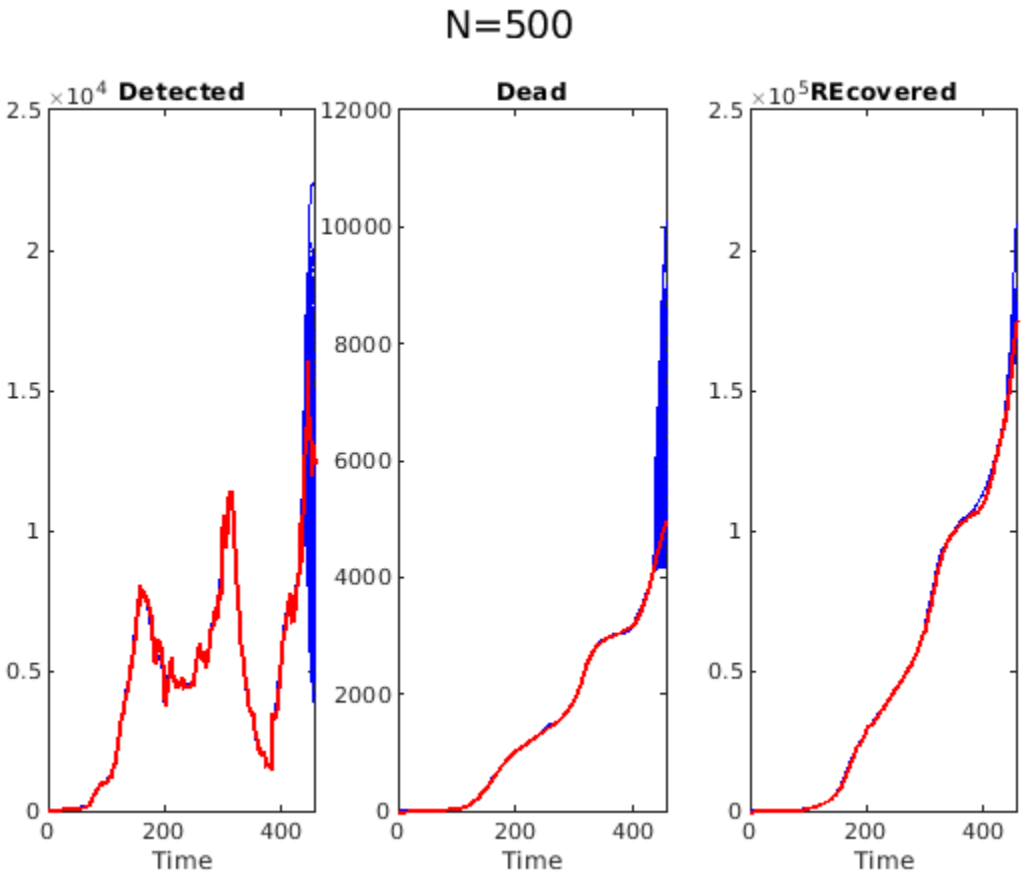
11.3. Identifiability analisys




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
z
a_L
η_L
a_μ
μ
ν
b
μ
BP
ϑ_P
η_ϑ
b_L
a_H
b_H
δ
ϑ_E
λ_{fq}
k_L
λ_{qf}
γ_H
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
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 data456 to the 468. The status of the validation is: COMPLETED.

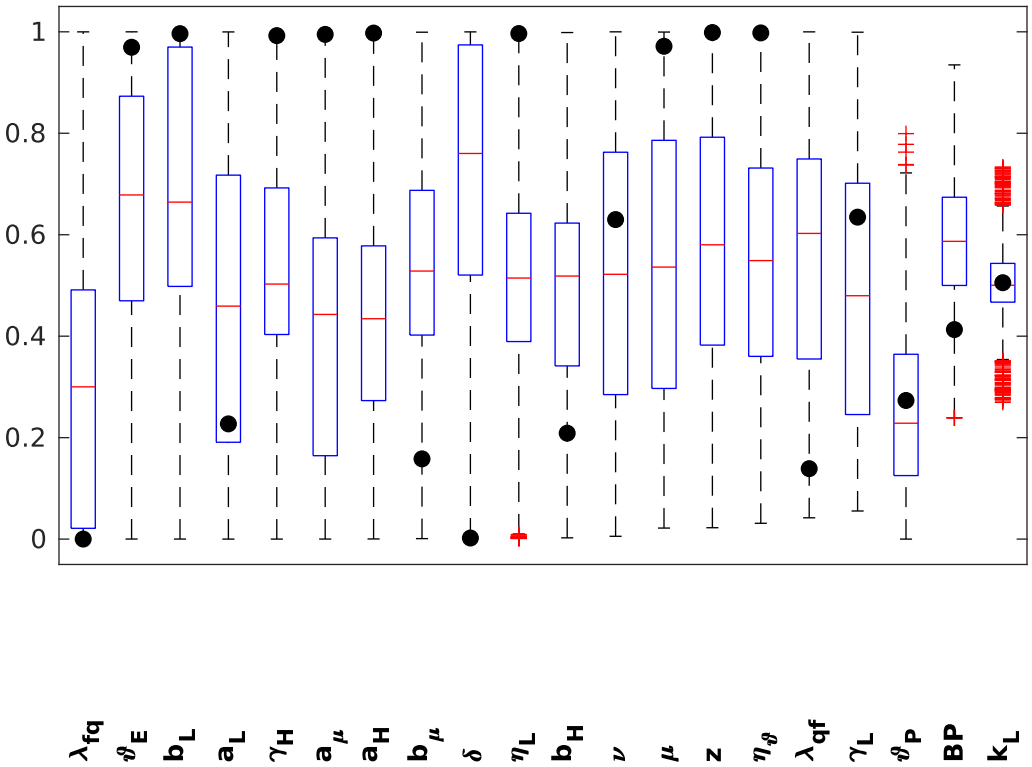
The number of estimations needed to perform the validation was1000.

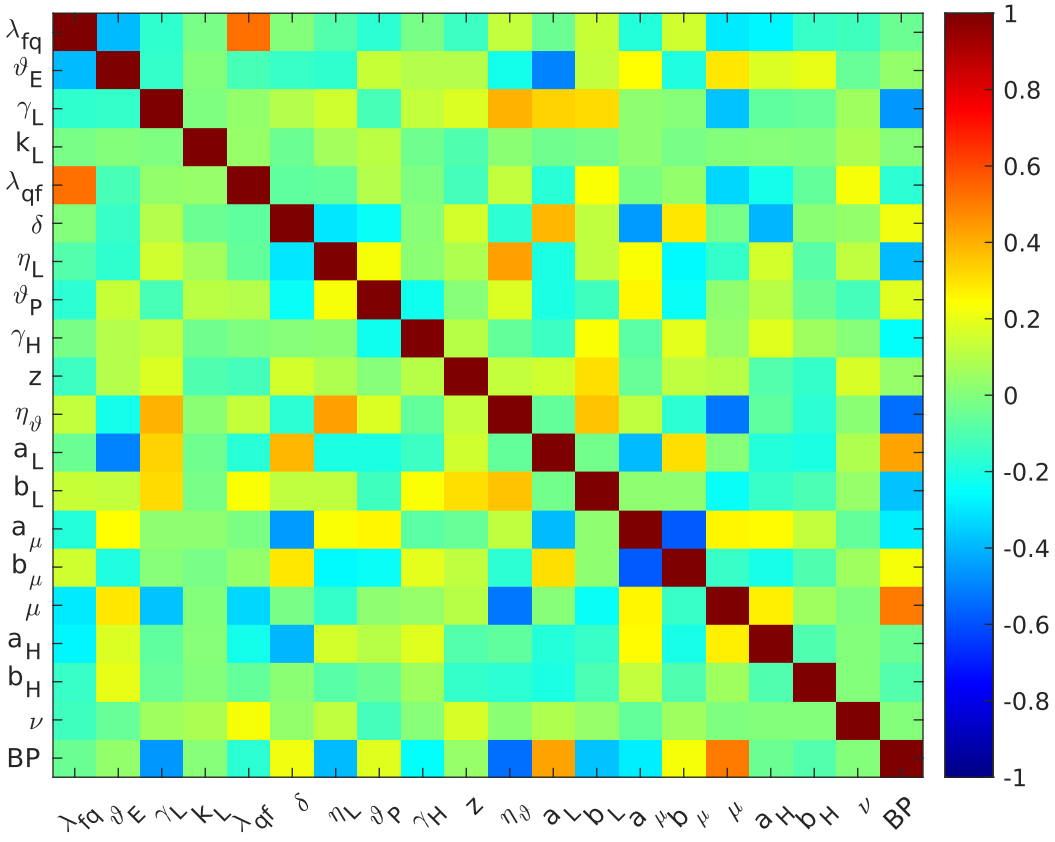
12.2. Estimated parameters with their intervals

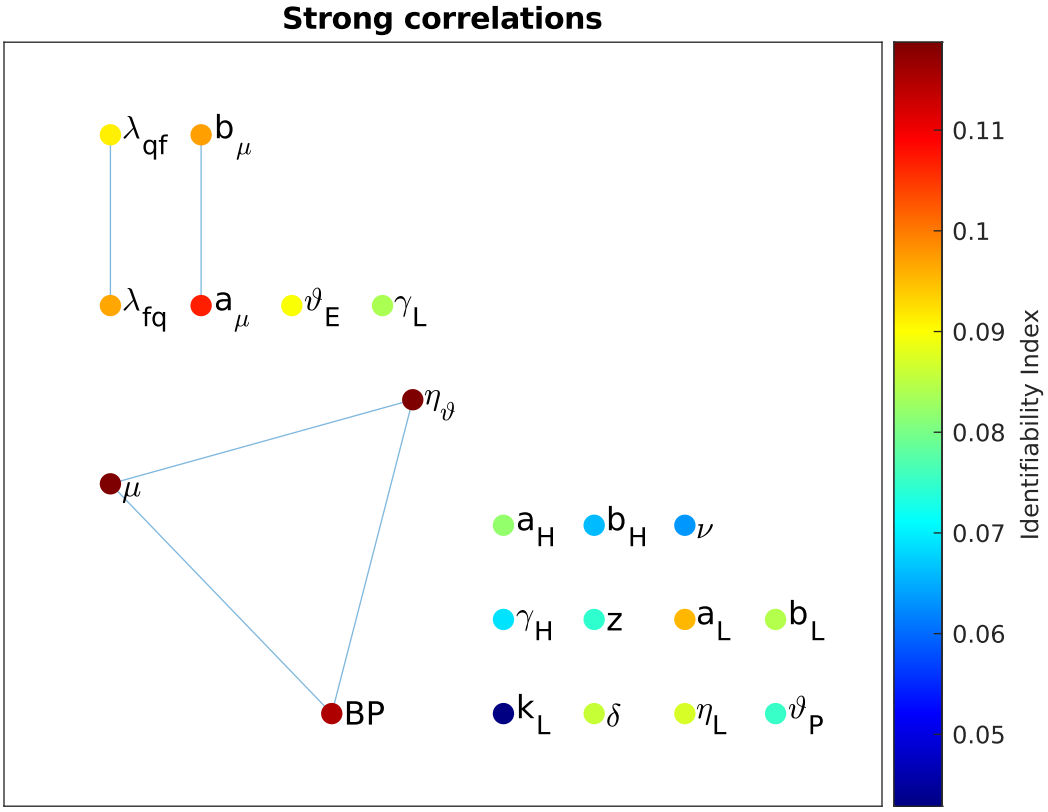
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.279'	'0.3212'	'0.3001'	'0.0001'	'0.0965'
\vartheta_E	'0.6551'	'0.7017'	'0.6784'	'0.9695'	'0.0899'
\gamma_L	'0.4595'	'0.5'	'0.4797'	'0.6346'	'0.0839'
k_L	'5.4162'	'5.5916'	'5.5039'	'5.5487'	'0.0429'
\lambda_{qf}	'0.5822'	'0.623'	'0.6026'	'0.1388'	'0.0912'
\delta	'0.1108'	'0.1172'	'0.114'	'0.0003'	'0.0859'
\eta_L	'0.4939'	'0.5354'	'0.5146'	'0.9966'	'0.0873'
\vartheta_P	'0.2134'	'0.2438'	'0.2286'	'0.2733'	'0.0754'
\gamma_H	'0.4821'	'0.5234'	'0.5027'	'0.9925'	'0.0691'
z	'16.7862'	'18.0235'	'17.4049'	'29.9571'	'0.0746'
\eta_\vartheta	'0.5286'	'0.5694'	'0.549'	'0.9978'	'0.1186'
a_L	'7.1146'	'7.7446'	'7.4296'	'4.1796'	'0.0955'
b_L	'10.0087'	'10.5906'	'10.2997'	'14.9493'	'0.0845'
a_\mu	'6.8747'	'7.5263'	'7.2005'	'14.9286'	'0.1067'
b_\mu	'8.1428'	'8.6526'	'8.3977'	'3.2142'	'0.0973'
\mu	'0.5132'	'0.5593'	'0.5362'	'0.9715'	'0.1187'
a_H	'6.7983'	'7.365'	'7.0816'	'14.9652'	'0.0822'
b_H	'7.994'	'8.5252'	'8.2596'	'3.9228'	'0.0661'
\nu	'249.7637'	'272.2463'	'261.005'	'314.9339'	'0.0636'
BP	'448.2392'	'448.7608'	'448.5'	'444.4993'	'0.1149'

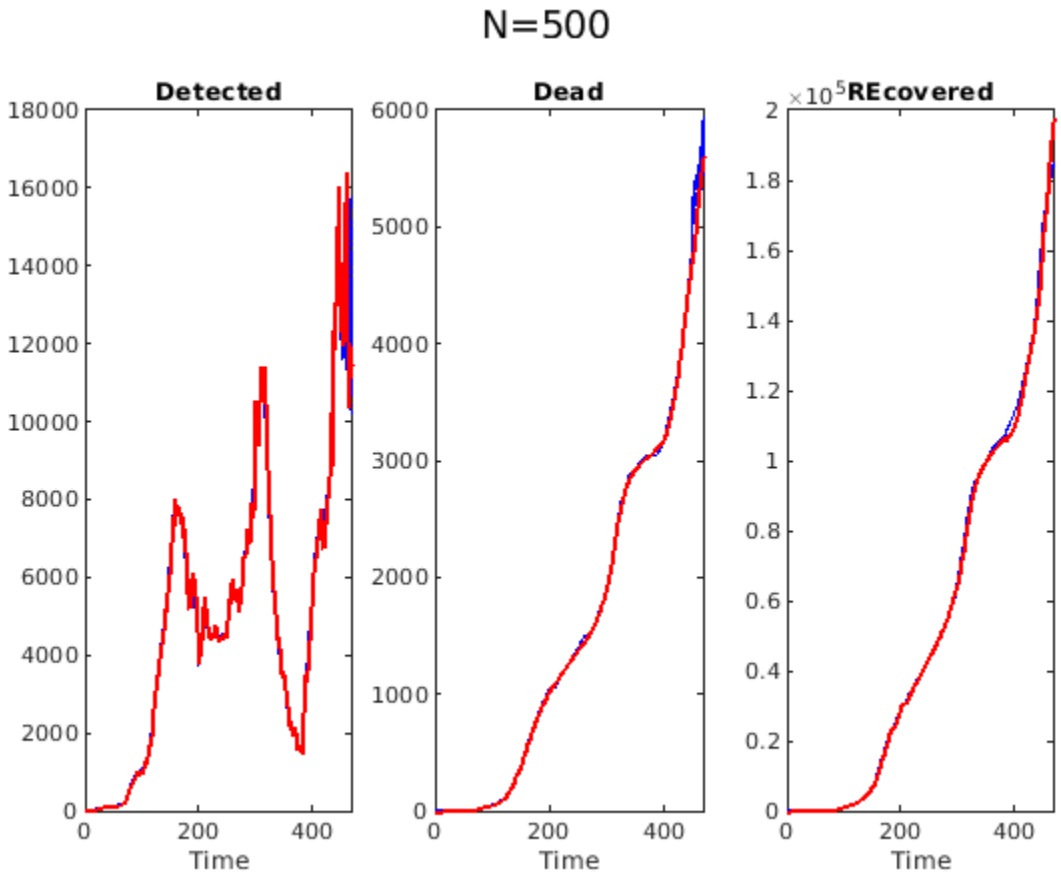
12.3. Identifiability analisys




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
λ_{qf}
b_{μ}
λ_{fq}
a_{μ}
ϑ_E
γ_L
η_{ϑ}
μ
BP
a_H
b_H
ν
γ_H
z
a_L
b_L
k_L
δ
η_L
ϑ_P
0.11
0.1
0.09
0.08
0.07
0.06
0.05
Identifiability Index

12.4. Uncertainty analisys



Chapter 13. Extension number13

13.1. Basic information

The extension to be validated consists of the time series from the data468 to the 513. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

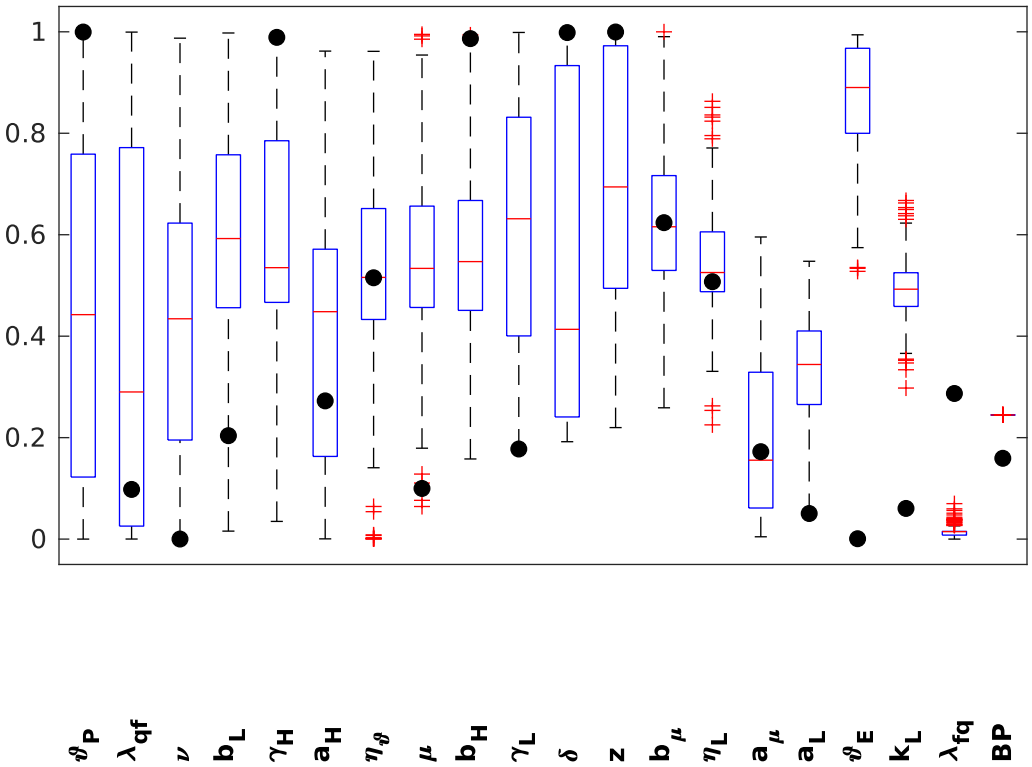
13.2. Estimated parameters with their intervals

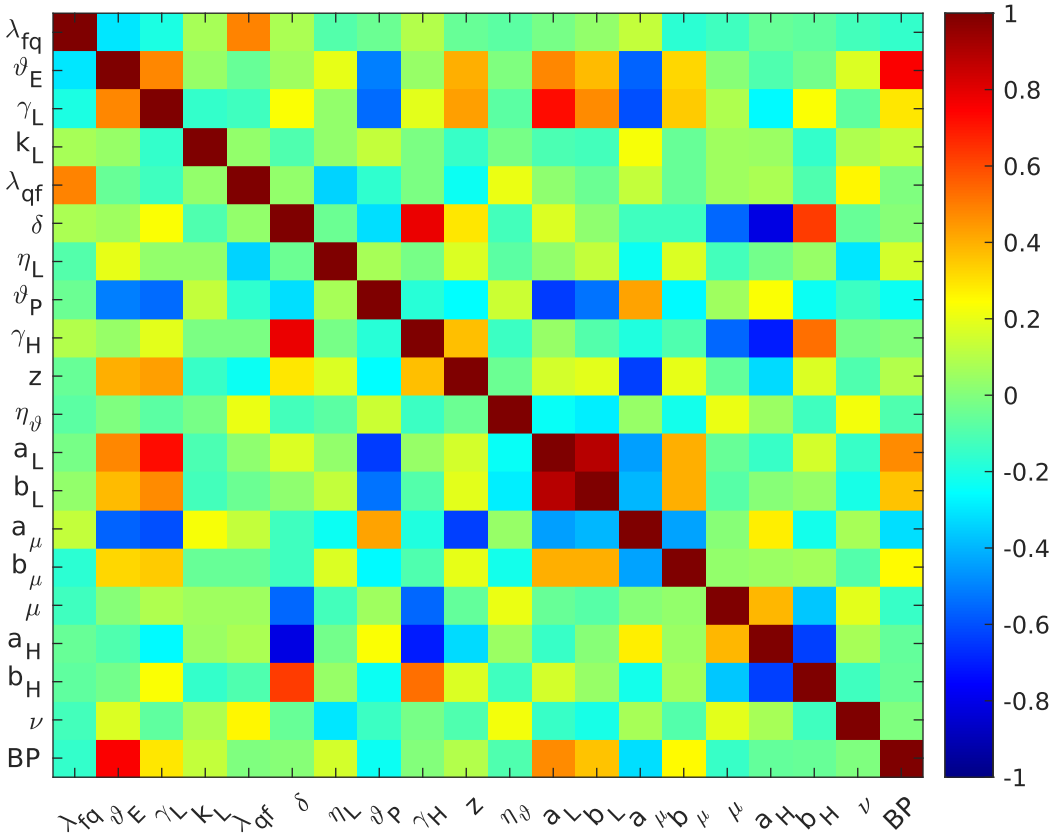
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.2701'	'0.3943'	'0.0148'	'0.287'	'0.0907'
\vartheta_E	'0.0001'	'0.0016'	'0.8897'	'0.0007'	'0.1629'
\gamma_L	'0.1478'	'0.2426'	'0.6315'	'0.1776'	'0.1811'
k_L	'1'	'10'	'5.4336'	'1.5441'	'0.0729'
\lambda_{qf}	'0.0195'	'0.1027'	'0.29'	'0.0979'	'0.131'
\delta	'0.0285'	'0.15'	'0.062'	'0.1498'	'0.1966'
\eta_L	'0.025'	'1'	'0.5255'	'0.5074'	'0.0918'
\vartheta_P	'0.8061'	'1'	'0.4424'	'0.9995'	'0.2089'
\gamma_H	'0.1067'	'1'	'0.535'	'0.989'	'0.1765'
z	'17.9962'	'30'	'20.8265'	'29.9887'	'0.1403'
\eta_\vartheta	'0'	'0.95'	'0.5159'	'0.5151'	'0.1019'
a_L	'1.3612'	'2.8393'	'5.8191'	'1.7063'	'0.1519'
b_L	'2.6296'	'9.7044'	'9.2942'	'3.8543'	'0.1574'
a_\mu	'1'	'15'	'3.1778'	'3.4124'	'0.1651'
b_\mu	'1.28'	'15'	'9.6099'	'9.7327'	'0.1024'
\mu	'0'	'0.2246'	'0.5334'	'0.0998'	'0.1325'
a_H	'1.28'	'15'	'7.276'	'4.8146'	'0.1687'
b_H	'2.4'	'15'	'8.6344'	'14.8116'	'0.1527'
\nu	'0'	'0.1311'	'217.1502'	'0.0583'	'0.1111'
BP	'463.4848'	'473.175'	'467.5'	'463.4861'	'0.0878'

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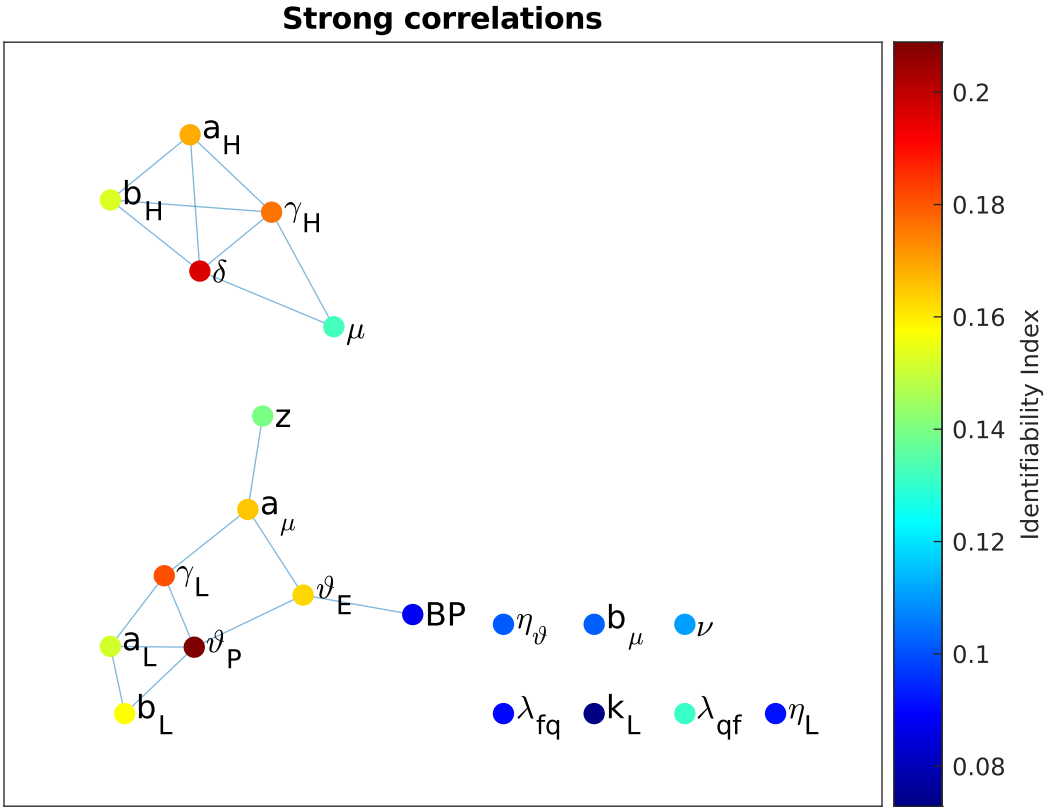
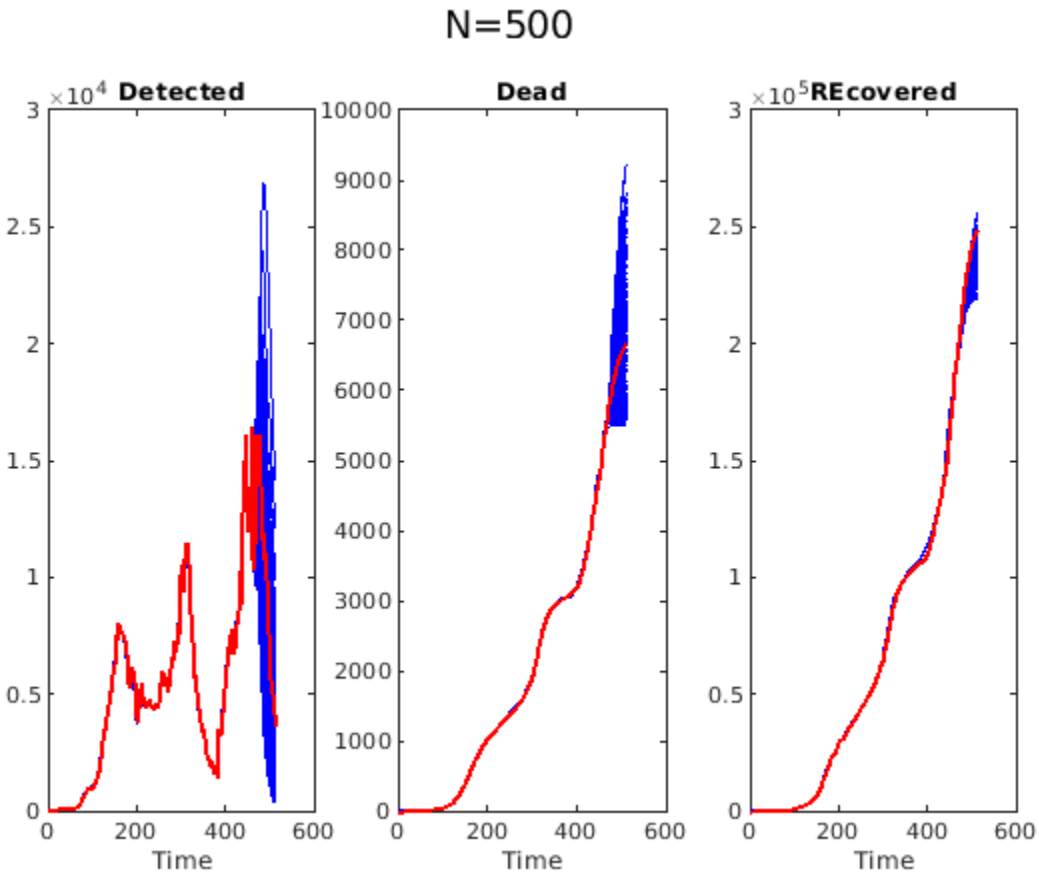
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
a H
b H
γ H
δ
μ
z
a μ
γ L
ϑ E
BP
η ϑ
b μ
ν
a L
ϑ P
b L
λ fq
k L
λ qf
η L
0.2
0.18
0.16
0.14
0.12
0.1
0.08
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 data513 to the 719. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

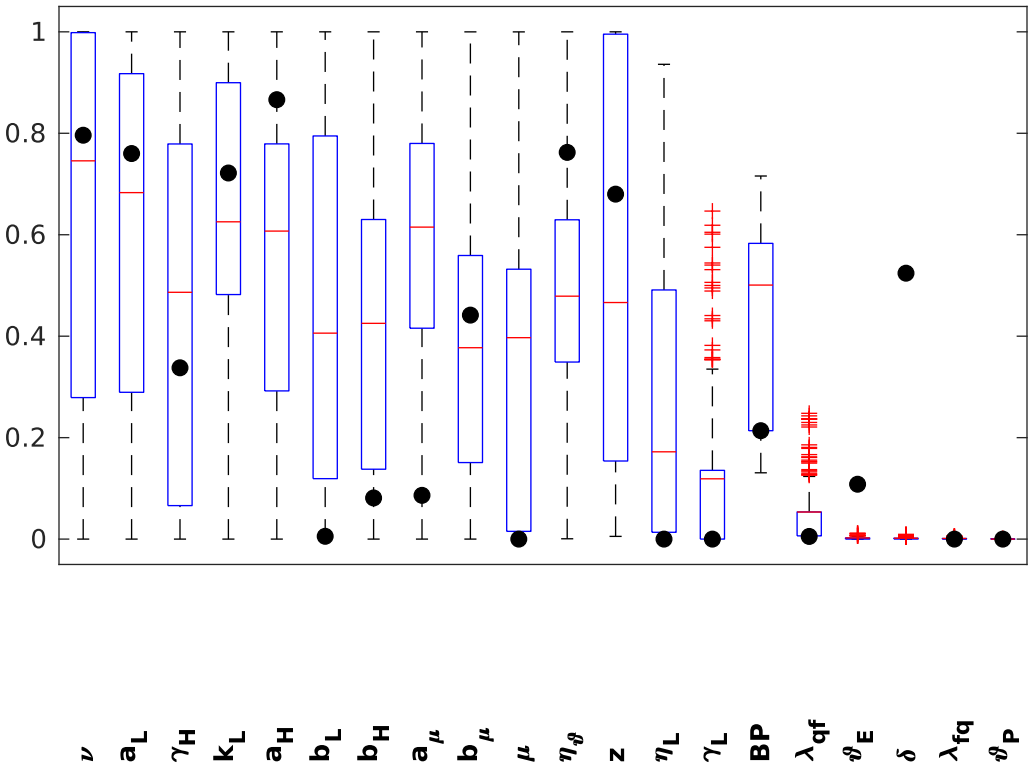
14.2. Estimated parameters with their intervals

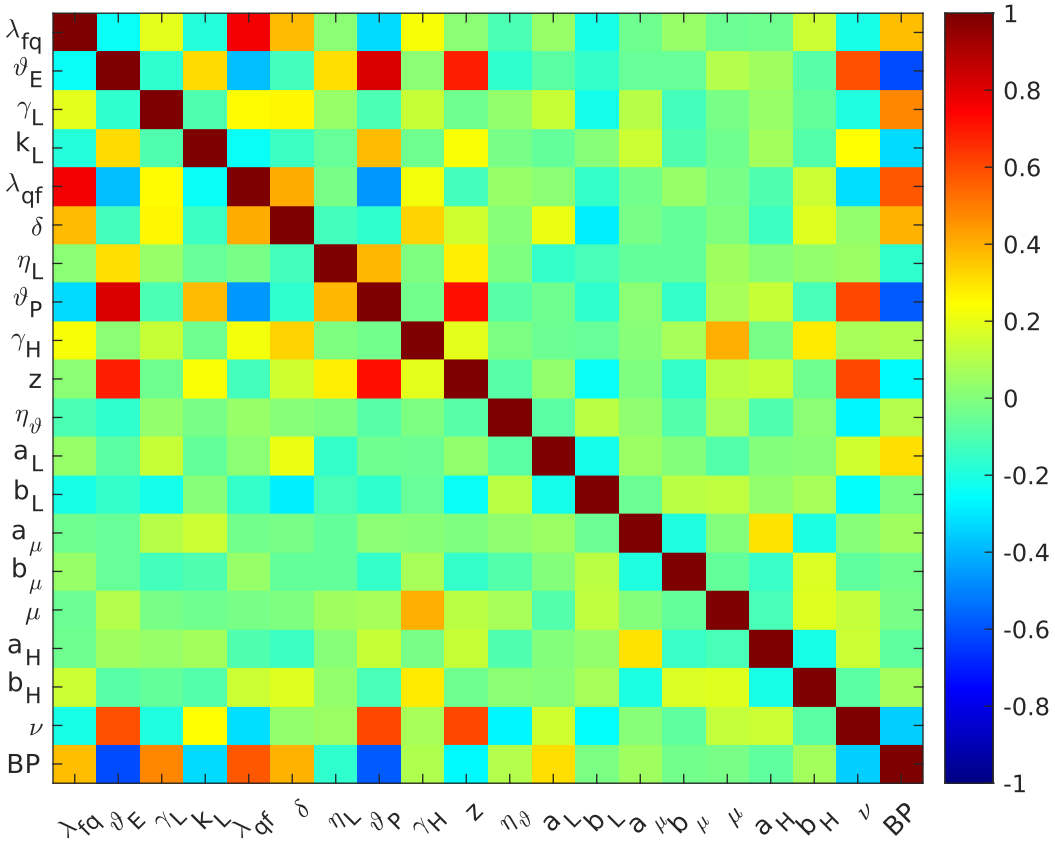
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

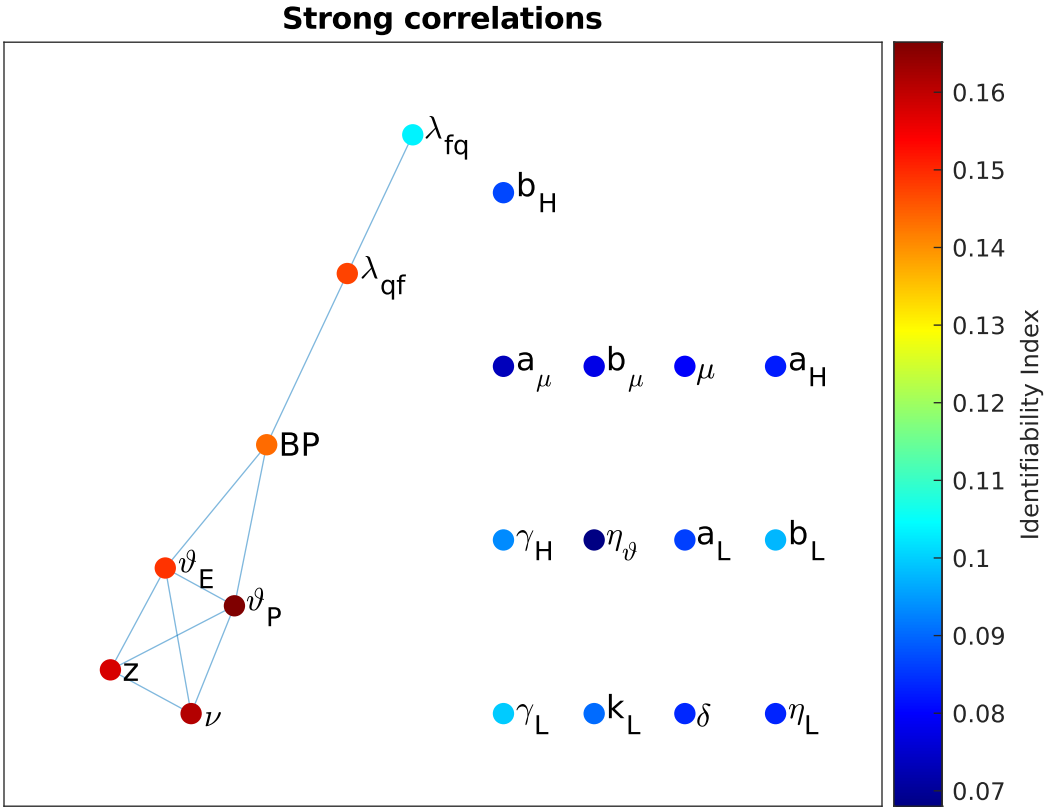
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0'	'0.0012'	'0'	'0.1036'
\vartheta_E	'0.1061'	'0.1661'	'0.0023'	'0.1082'	'0.149'
\gamma_L	'0'	'0'	'0.1189'	'0'	'0.0998'
k_L	'1'	'10'	'6.6294'	'7.4952'	'0.0904'
\lambda_{qf}	'0.0045'	'0.0062'	'0.0536'	'0.0053'	'0.1475'
\delta	'0'	'0.1368'	'0.0003'	'0.0786'	'0.0838'
\eta_L	'0'	'0'	'0.1723'	'0'	'0.0836'
\vartheta_P	'0'	'0'	'0.0001'	'0'	'0.1664'
\gamma_H	'0.076'	'0.7598'	'0.4865'	'0.3377'	'0.0936'
z	'17.1747'	'22.9489'	'13.9907'	'20.4008'	'0.1578'
\eta_\vartheta	'0.2966'	'1'	'0.4789'	'0.7623'	'0.068'
a_L	'1'	'15'	'10.5624'	'11.6409'	'0.0864'
b_L	'1'	'15'	'6.684'	'1.0774'	'0.0977'
a_\mu	'1'	'15'	'9.6103'	'2.2077'	'0.0736'
b_\mu	'1'	'15'	'6.282'	'7.1816'	'0.078'
\mu	'0'	'0'	'0.3971'	'0'	'0.0797'
a_H	'1.35'	'15'	'9.5007'	'13.1273'	'0.0827'
b_H	'1.35'	'15'	'6.9546'	'2.136'	'0.0869'
\nu	'332.4124'	'491.0092'	'372.8405'	'398.0815'	'0.1611'
BP	'507.9468'	'525.6743'	'588.6868'	'519.5'	'0.1436'

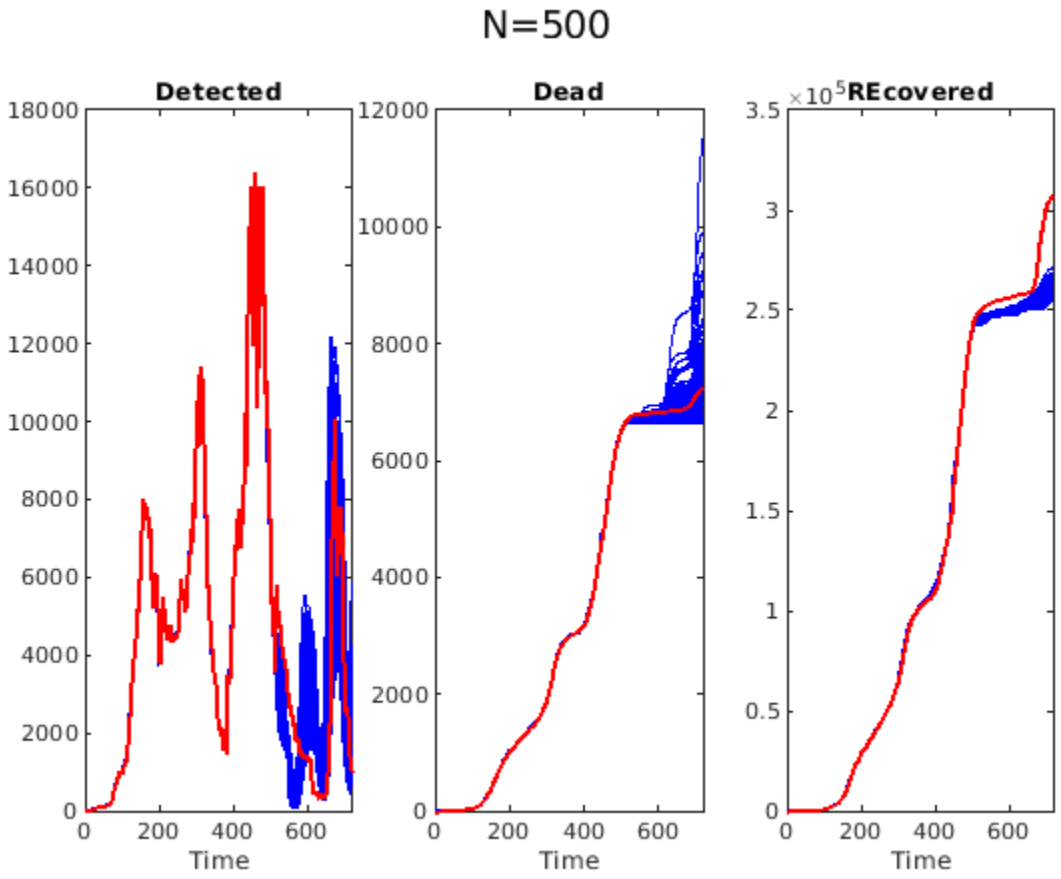
14.3. Identifiability analisys




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
λ_{fq}
b_H
λ_{qf}
a_μ
b_μ
μ
a_H
BP
γ_H
η_ϑ
a_L
b_L
ϑ_E
ϑ_P
z
ν
γ_L
k_L
δ
η_L
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
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 data719 to the 733. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

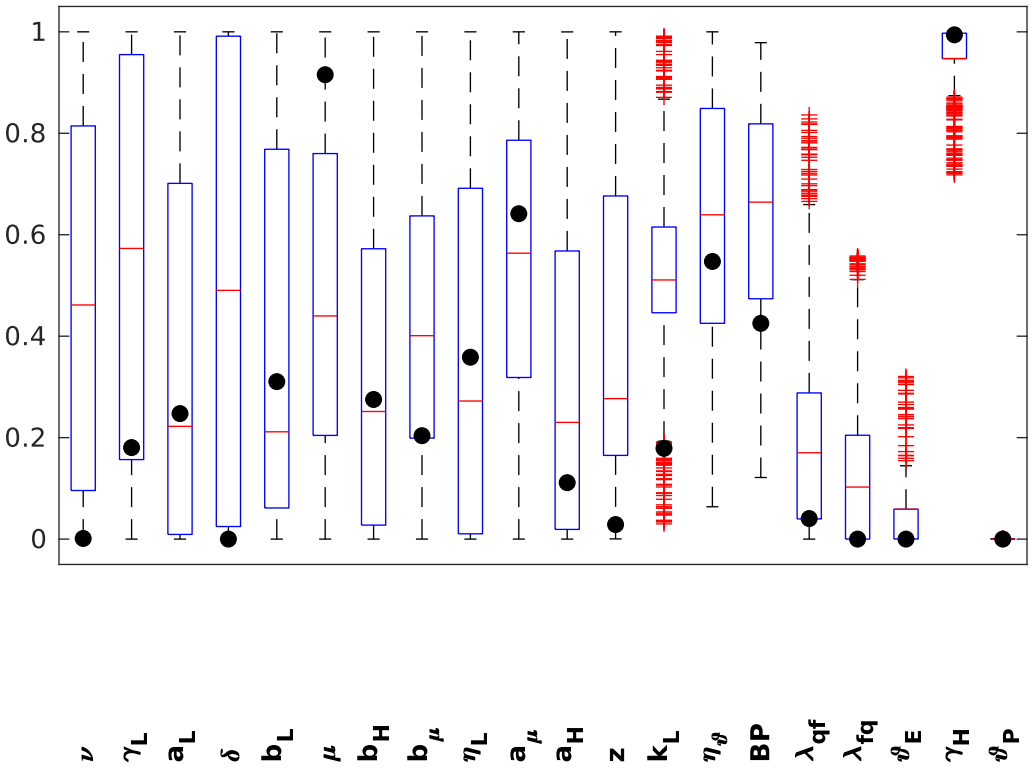
15.2. Estimated parameters with their intervals

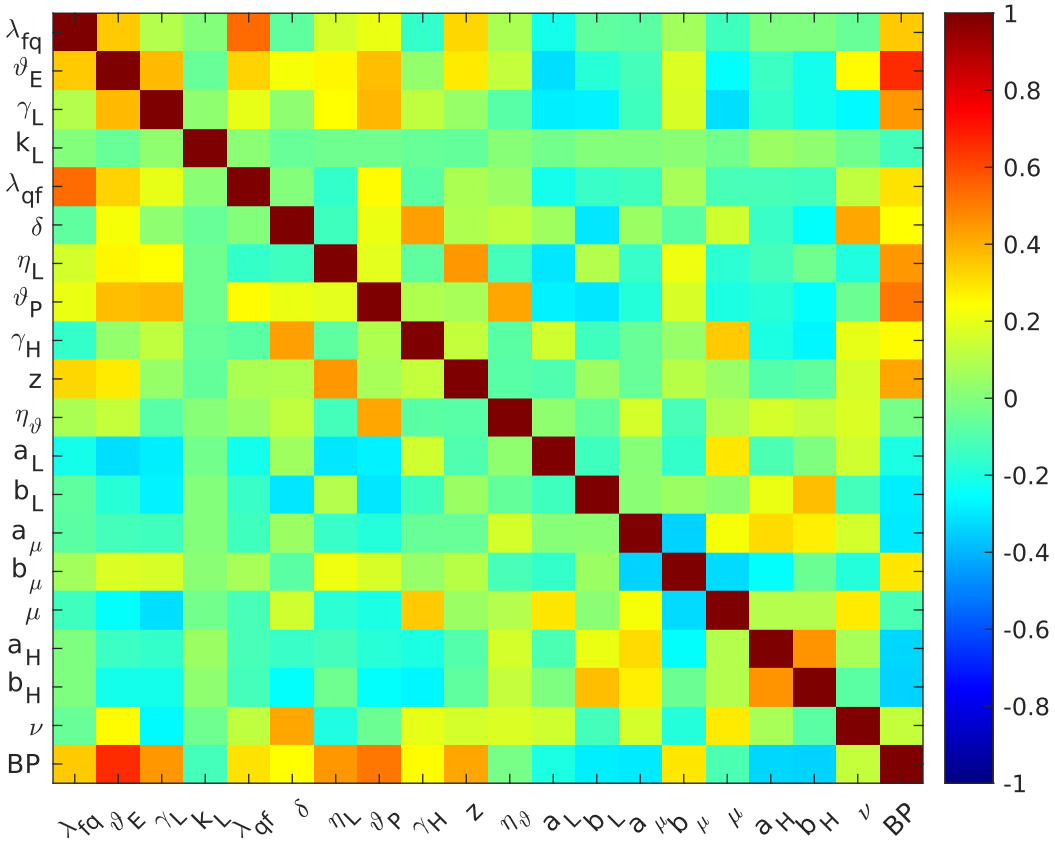
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

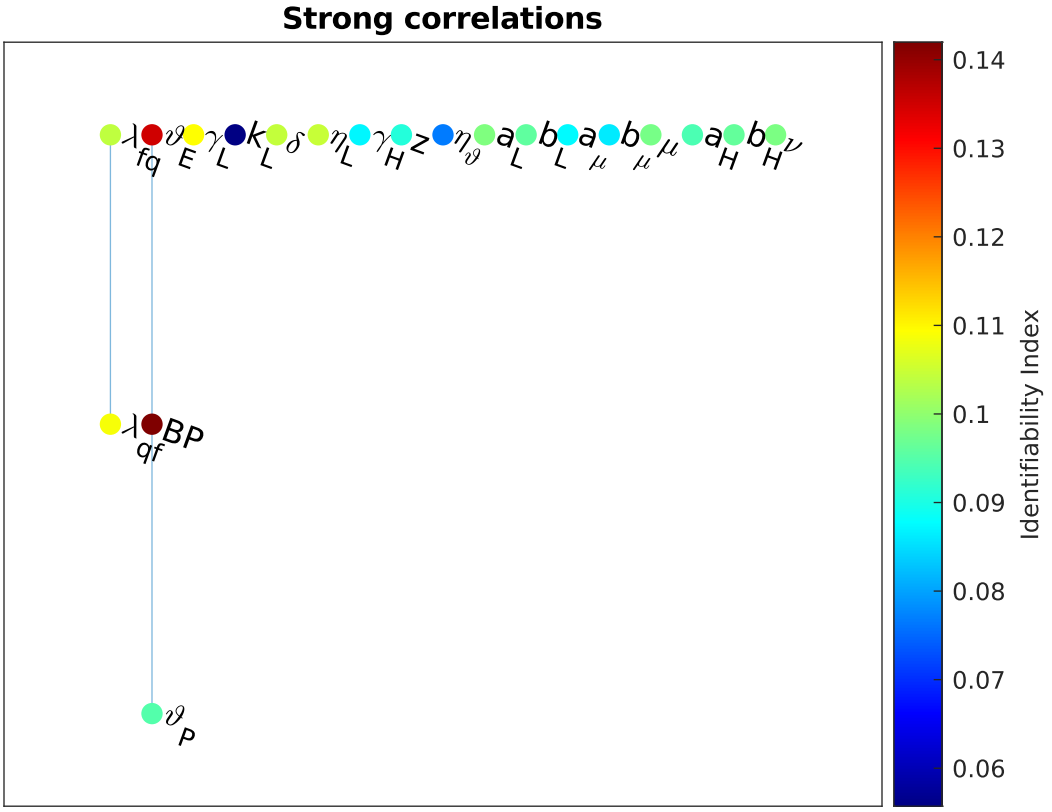
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0'	'0.1026'	'0'	'0.1039'
\vartheta_E	'0'	'0'	'0.0589'	'0'	'0.1349'
\gamma_L	'0.1788'	'0.1959'	'0.573'	'0.1804'	'0.1095'
k_L	'2.4015'	'5.34'	'5.5977'	'2.61'	'0.0557'
\lambda_{qf}	'0.0395'	'0.0589'	'0.1702'	'0.0405'	'0.1089'
\delta	'0'	'0'	'0.0736'	'0'	'0.1043'
\eta_L	'0.352'	'0.5488'	'0.2722'	'0.3586'	'0.1048'
\vartheta_P	'0'	'0'	'0.0001'	'0'	'0.095'
\gamma_H	'0.8408'	'1'	'0.9473'	'0.9941'	'0.0872'
z	'0.8514'	'0.9482'	'8.3072'	'0.8596'	'0.0908'
\eta_\vartheta	'0.5466'	'0.5714'	'0.6393'	'0.5473'	'0.0766'
a_L	'3.7416'	'4.474'	'4.1122'	'4.4641'	'0.0988'
b_L	'4.3265'	'6.1665'	'3.9611'	'5.3457'	'0.0961'
a_\mu	'5.6616'	'10.2332'	'8.891'	'9.98'	'0.0875'
b_\mu	'3.0702'	'8.3061'	'6.6137'	'3.8542'	'0.0864'
\mu	'0.6012'	'0.9252'	'0.4399'	'0.9155'	'0.0981'
a_H	'2.2756'	'5.0654'	'4.2212'	'2.5575'	'0.0944'
b_H	'2.7299'	'6.4372'	'4.5215'	'4.8533'	'0.0962'
\nu	'0.2762'	'0.8374'	'230.7712'	'0.6362'	'0.0984'
BP	'597.5'	'723'	'652.5'	'602.3163'	'0.142'

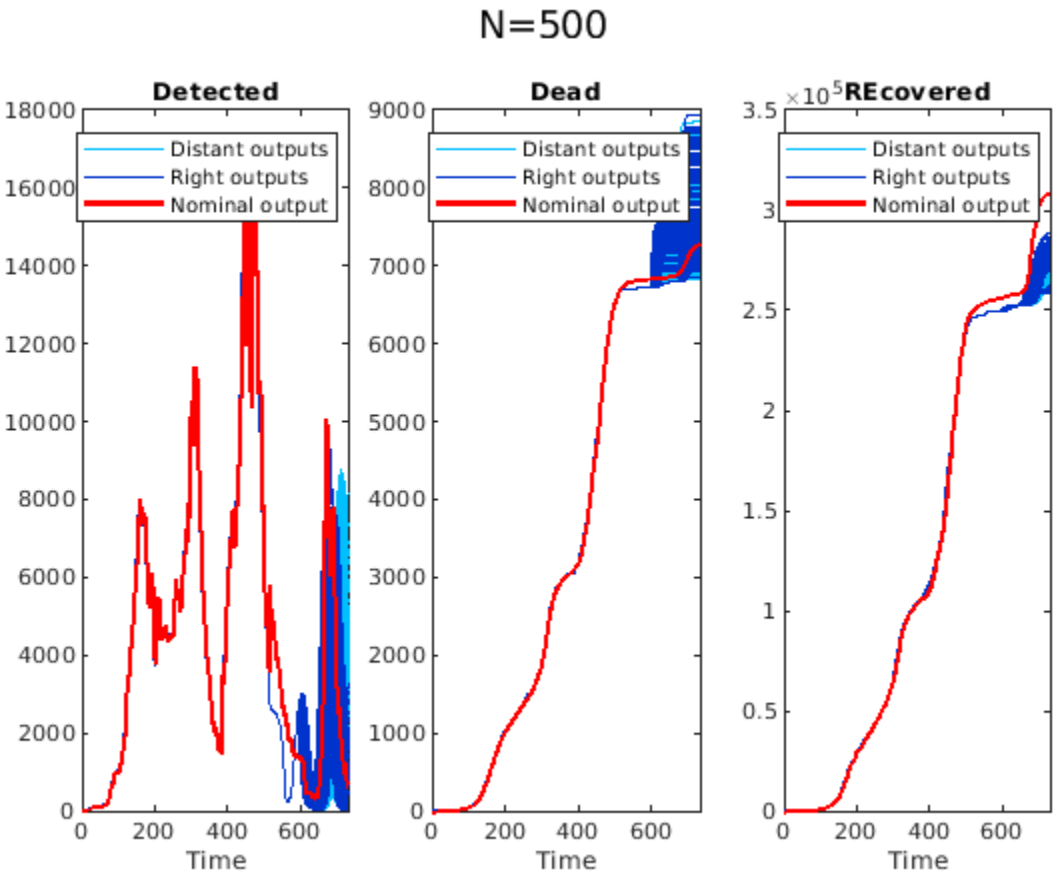
15.3. Identifiability analisys




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


Strong correlations
Identifiability Index
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06

15.4. Uncertainty analisys



Chapter 16. Extension number16

16.1. Basic information

The extension to be validated consists of the time series from the data733 to the 735. The status of the validation is: COMPLETED.

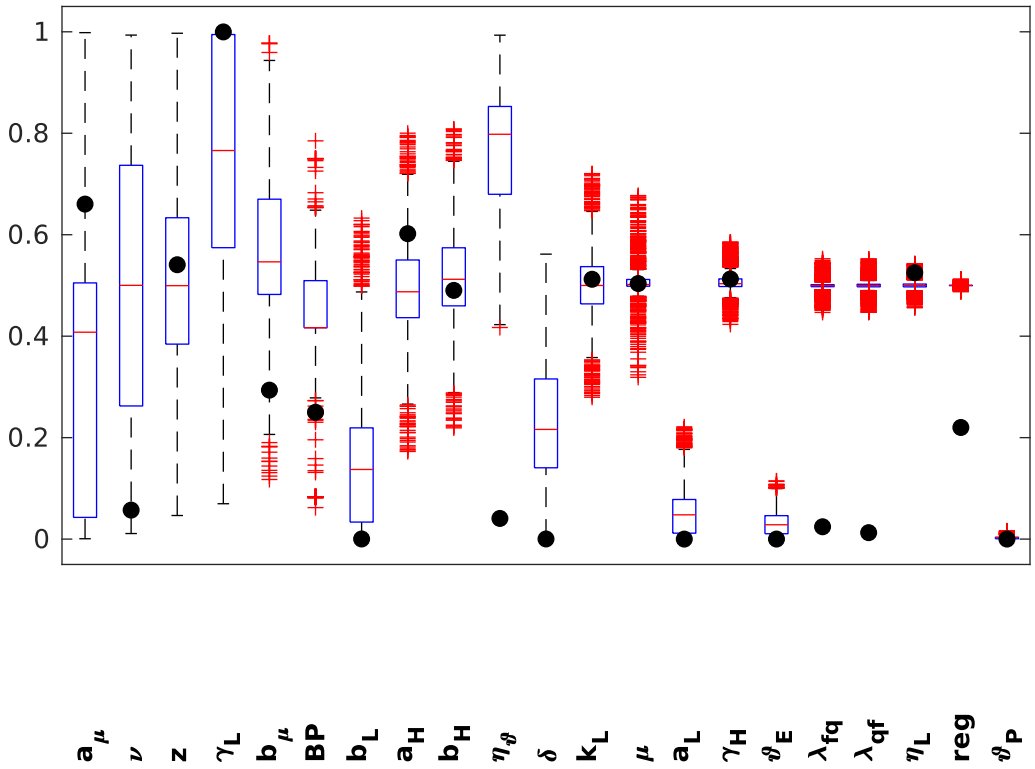
The number of estimations needed to perform the validation was1000.

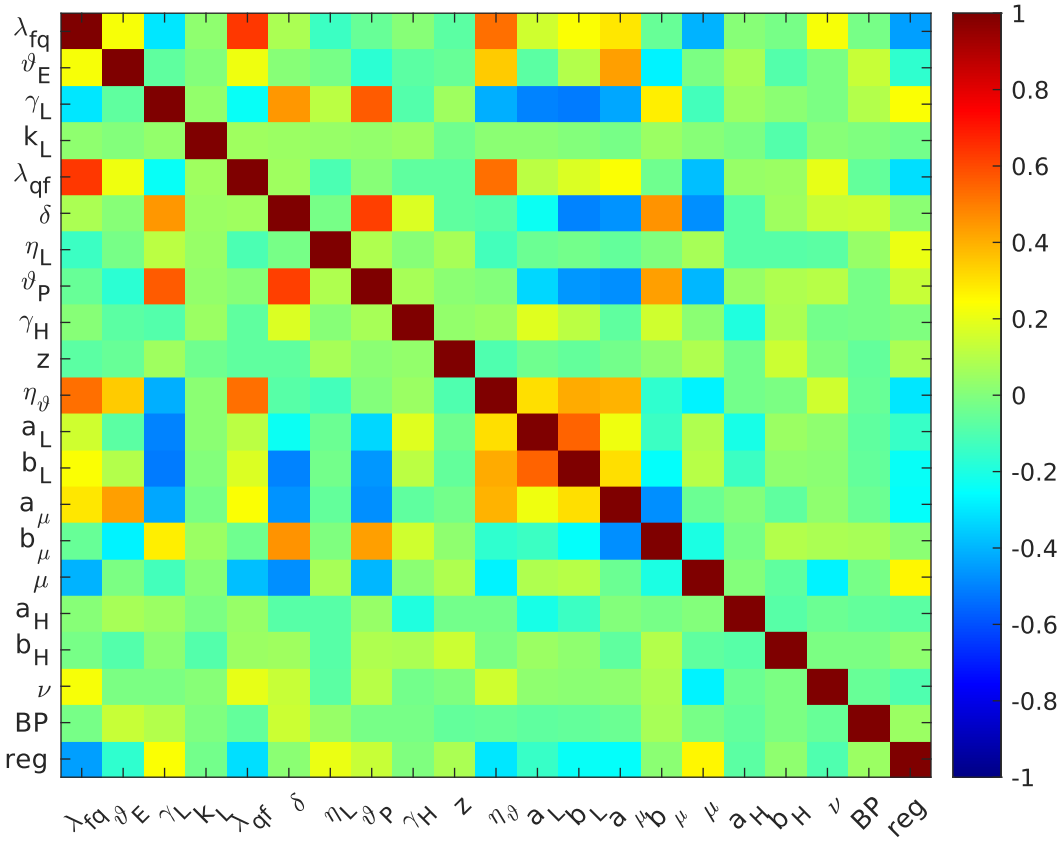
16.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4885'	'0.5109'	'0.4997'	'0.0243'	'0.106'
\vartheta_E	'0.0256'	'0.0309'	'0.0283'	'0.0001'	'0.0568'
\gamma_L	'0.7488'	'0.7831'	'0.766'	'0.9998'	'0.1191'
k_L	'5.4143'	'5.5854'	'5.4998'	'5.6098'	'0.0407'
\lambda_{qf}	'0.4888'	'0.5105'	'0.4997'	'0.0127'	'0.1013'
\delta	'0.0306'	'0.0343'	'0.0324'	'0'	'0.0981'
\eta_L	'0.4942'	'0.5059'	'0.5'	'0.5251'	'0.0467'
\vartheta_P	'0.0019'	'0.0042'	'0.0031'	'0'	'0.0979'
\gamma_H	'0.4953'	'0.5116'	'0.5034'	'0.5127'	'0.0499'
z	'14.5629'	'15.4126'	'14.9877'	'16.2247'	'0.0516'
\eta_\vartheta	'0.7804'	'0.8156'	'0.798'	'0.0407'	'0.1162'
a_L	'1.4993'	'1.8404'	'1.6699'	'1.0003'	'0.0895'
b_L	'2.6395'	'3.2038'	'2.9217'	'1.0036'	'0.1188'
a_\mu	'6.4567'	'6.9628'	'6.7097'	'10.2451'	'0.0933'
b_\mu	'8.4623'	'8.8401'	'8.6512'	'5.1109'	'0.0764'
\mu	'0.4863'	'0.5175'	'0.5019'	'0.5038'	'0.079'
a_H	'7.6579'	'7.9929'	'7.8254'	'9.4287'	'0.0509'
b_H	'8.0218'	'8.3182'	'8.17'	'7.8639'	'0.0484'
\nu	'239.3589'	'260.8397'	'250.0993'	'28.5839'	'0.0645'
BP	'721.4397'	'721.5603'	'721.5'	'720.5'	'0.047'
reg	'0.1229'	'0.1271'	'0.125'	'0.055'	'0.0693'

16.3. Identifiability analisys




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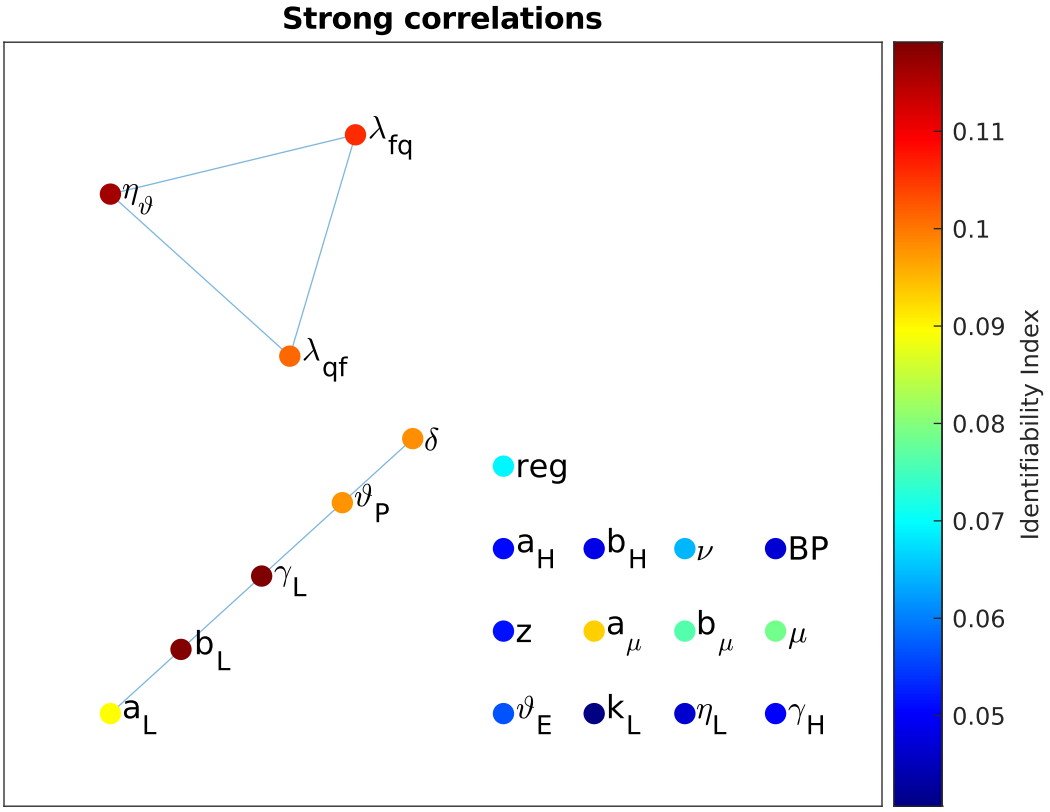
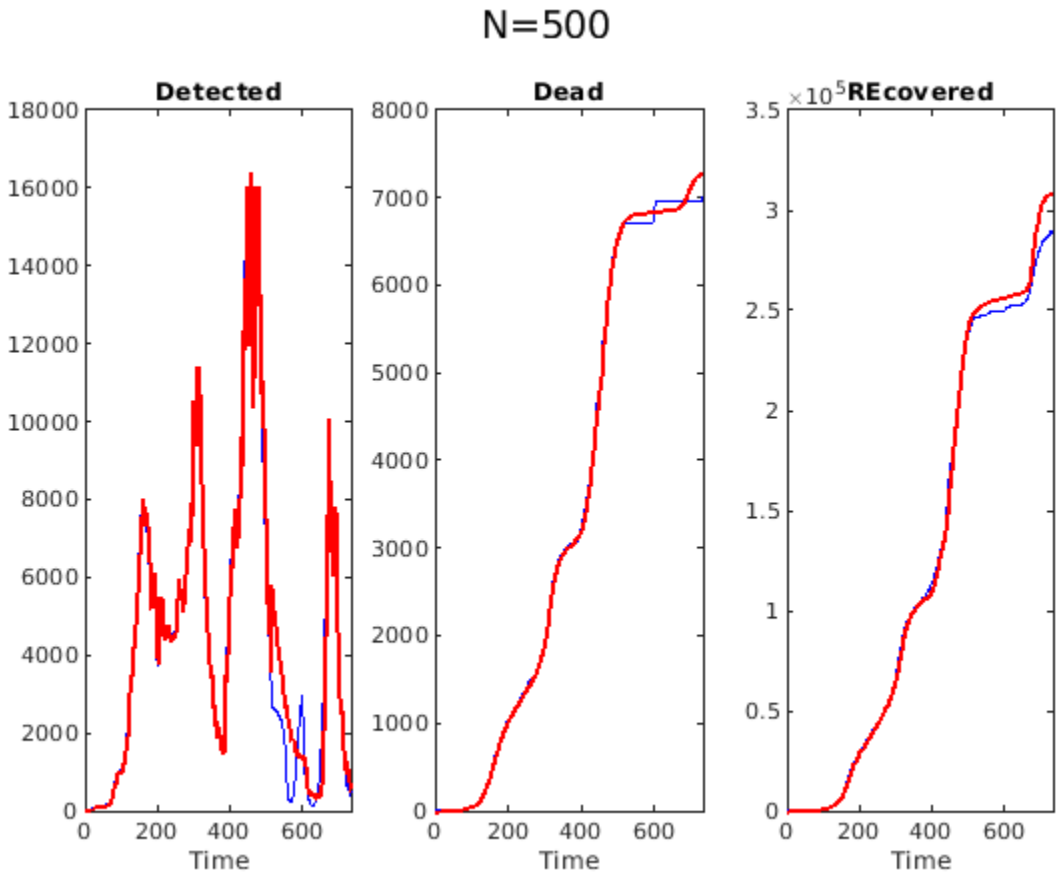
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
η_{ϑ}
λ_{qf}
δ
ϑ_P
γ_L
b_L
a_L
reg
a_H
b_H
ν
BP
z
a_{μ}
b_{μ}
μ
ϑ_E
k_L
η_L
γ_H
0.11
0.1
0.09
0.08
0.07
0.06
0.05
Identifiability Index

16.4. Uncertainty analisys