Validation process forLA ESTRELLA

The epidemiology research group, EAFIT

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Chapter 1. Extension number1

1.1. Basic information

The extension to be validated consists of the time series from the data1 to the 82. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

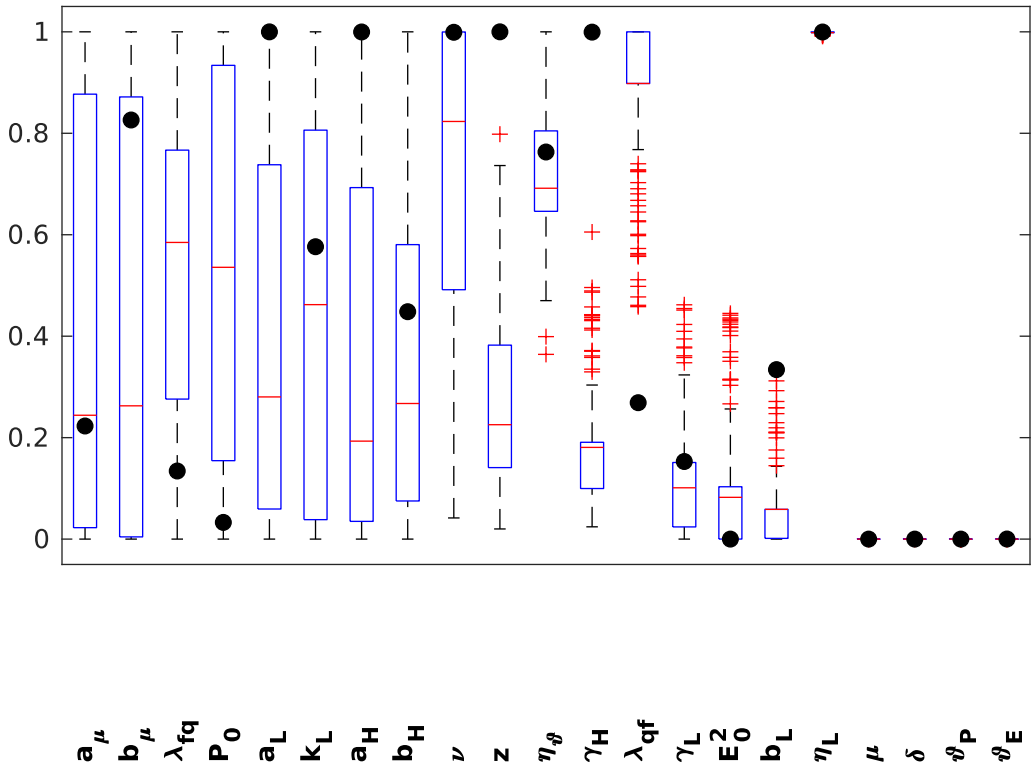
1.2. Estimated parameters with their intervals

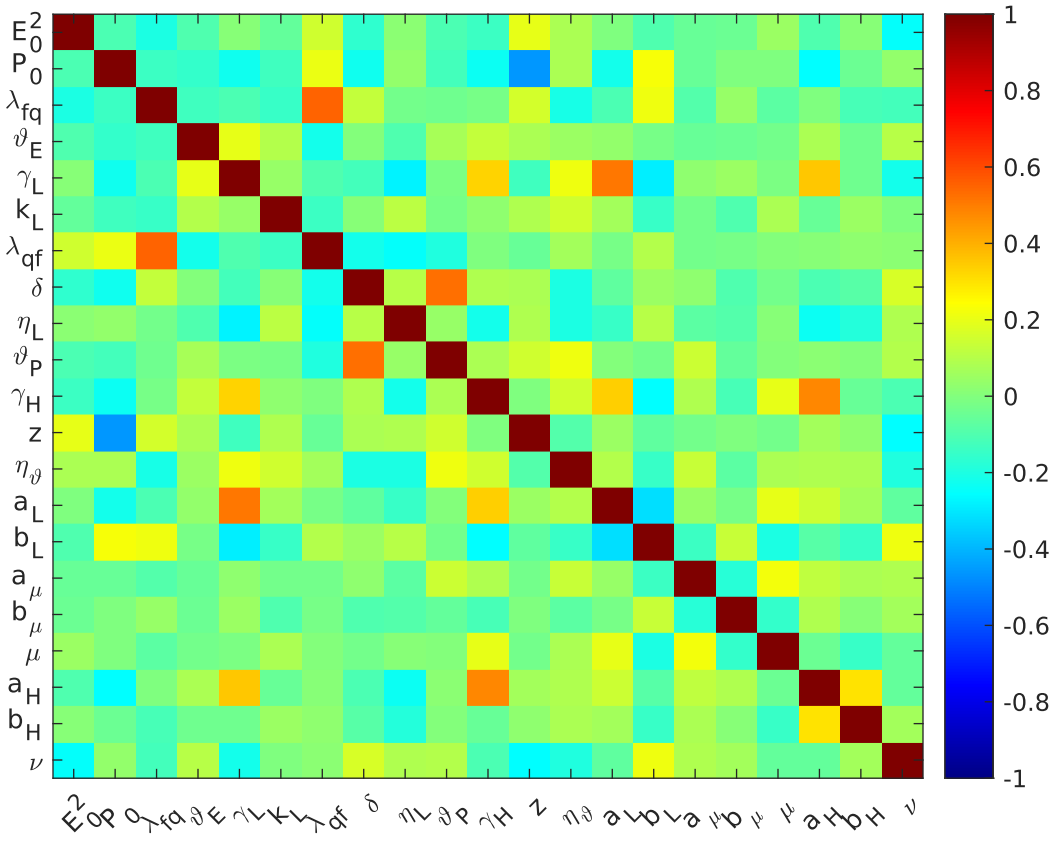
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
E^2_0	'0.0031'	'0.0694'	'164.6758'	'0.034'	'0.0965'
P_0	'12.139'	'62.344'	'214.3158'	'13.1692'	'0.1273'
\lambda_{fq}	'0.1161'	'0.1482'	'0.5848'	'0.1342'	'0.1207'
\vartheta_E	'0.0001'	'0.0004'	'0'	'0.0002'	'0.0447'
\gamma_L	'0.082'	'0.1791'	'0.1011'	'0.1529'	'0.1267'
k_L	'1.45'	'9.5725'	'5.1598'	'6.1874'	'0.1115'
\lambda_{qf}	'0.2351'	'0.3057'	'0.8982'	'0.2689'	'0.1248'
\delta	'0'	'0'	'0'	'0'	'0.0673'
\eta_L	'0.5174'	'1'	'0.9983'	'0.9996'	'0.089'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0586'
\gamma_H	'0.7739'	'1'	'0.1808'	'0.9994'	'0.1219'
z	'20.2683'	'30'	'6.7653'	'29.9997'	'0.1008'
\eta_\vartheta	'0.7602'	'0.7859'	'0.6917'	'0.7631'	'0.0814'
a_L	'10.8423'	'15'	'4.9238'	'14.9991'	'0.1346'
b_L	'3.0485'	'5.7747'	'1.8207'	'5.6774'	'0.1252'
a_\mu	'2.0093'	'4.5691'	'4.4182'	'4.1215'	'0.1163'
b_\mu	'8.6239'	'13.1302'	'4.6782'	'12.5665'	'0.1147'
\mu	'0'	'0'	'0'	'0'	'0.0685'
a_H	'9.2281'	'15'	'3.7039'	'14.9961'	'0.1248'
b_H	'4.2157'	'9.9317'	'4.7423'	'7.2759'	'0.1048'
\nu	'382.2282'	'500'	'411.6495'	'499.551'	'0.1049'

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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0.2
0
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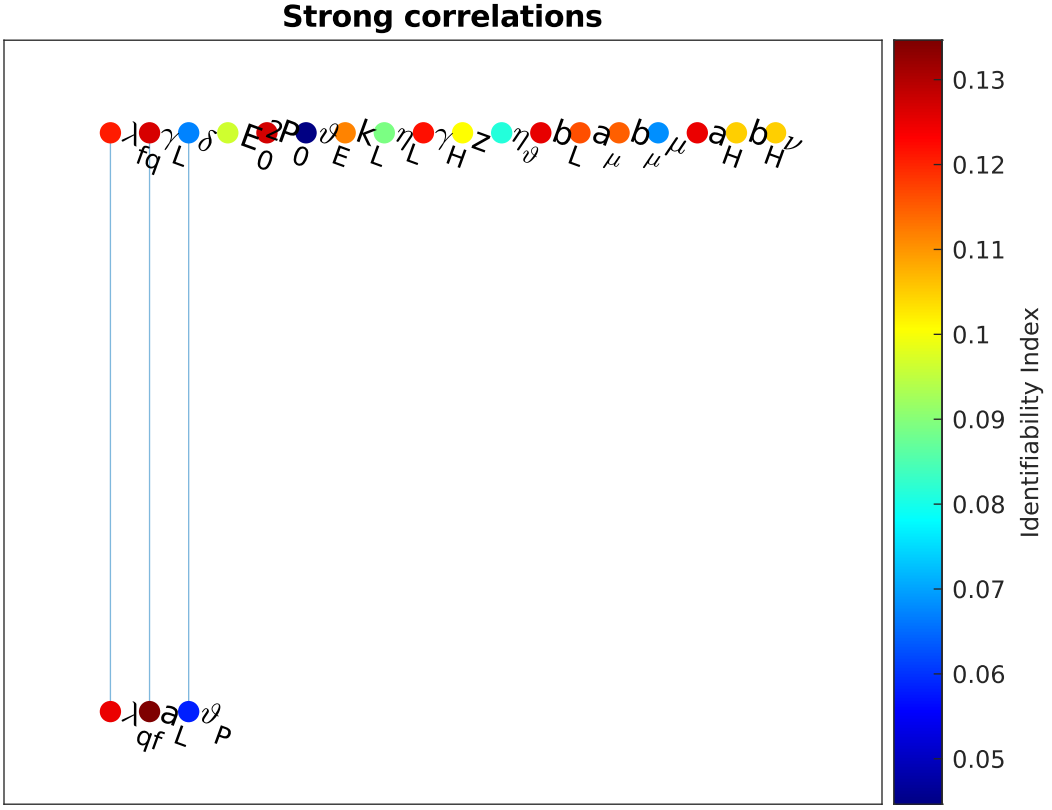
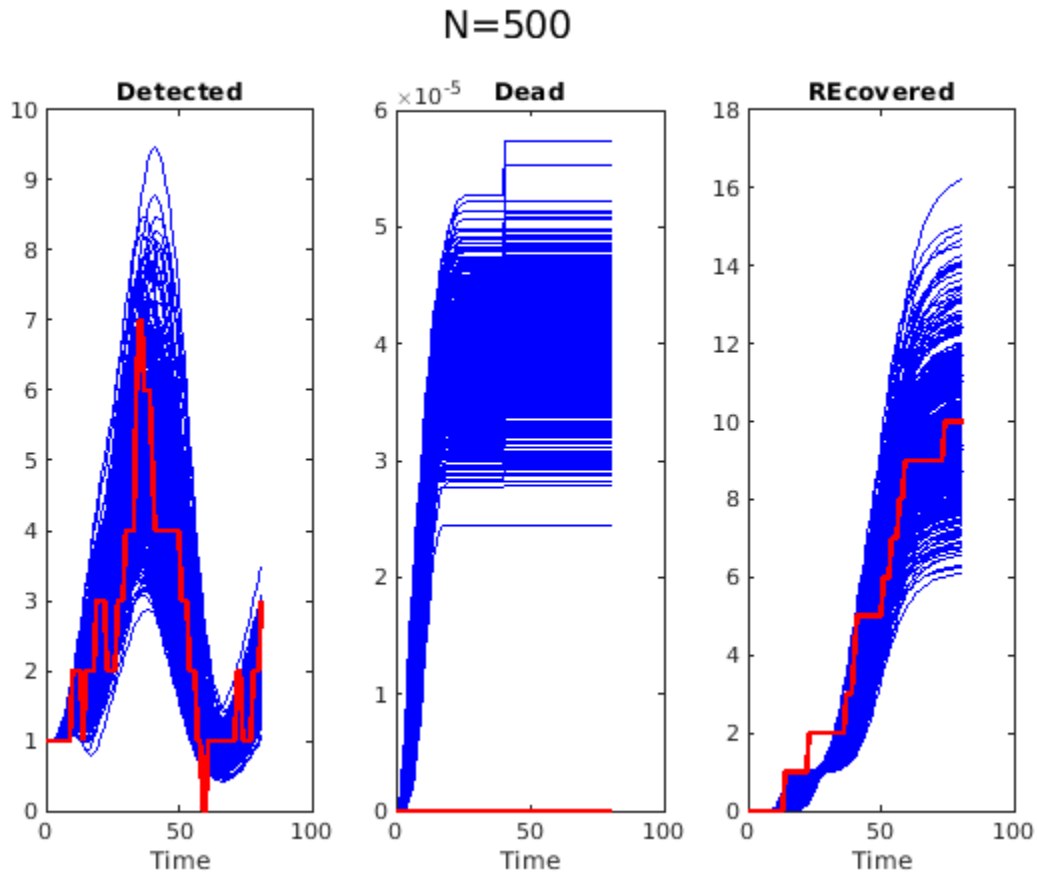
-0.4
-0.6
-0.8
-1


Strong correlations
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
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 data82 to the 123. The status of the validation is: COMPLETED.

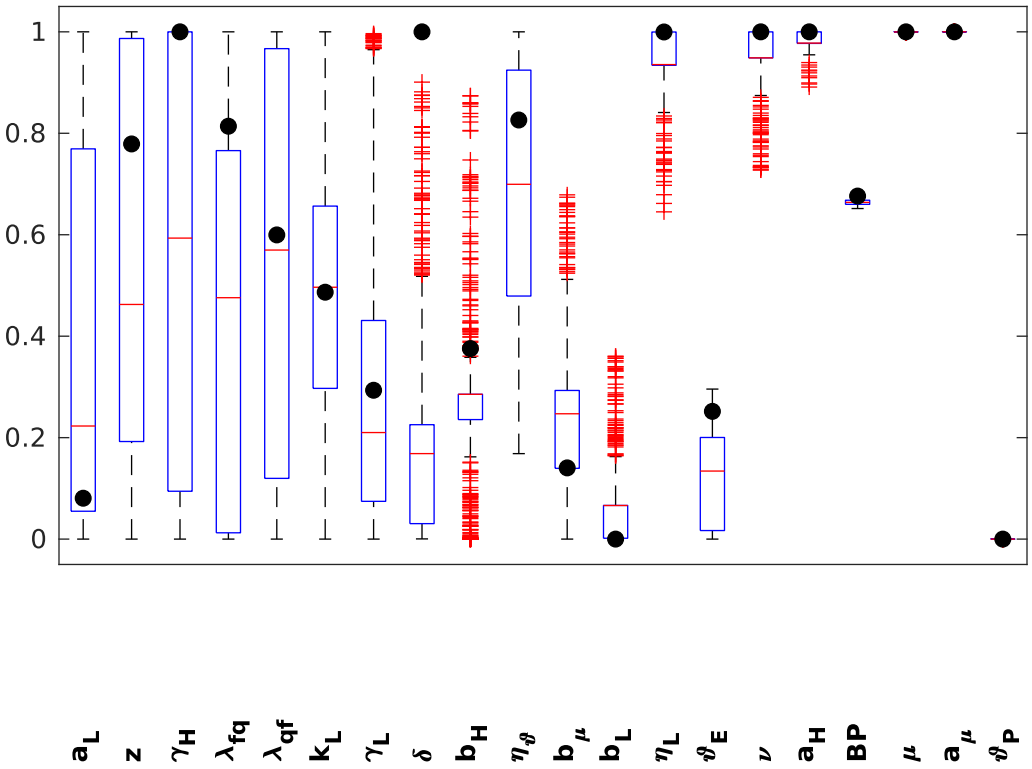
The number of estimations needed to perform the validation was1000.

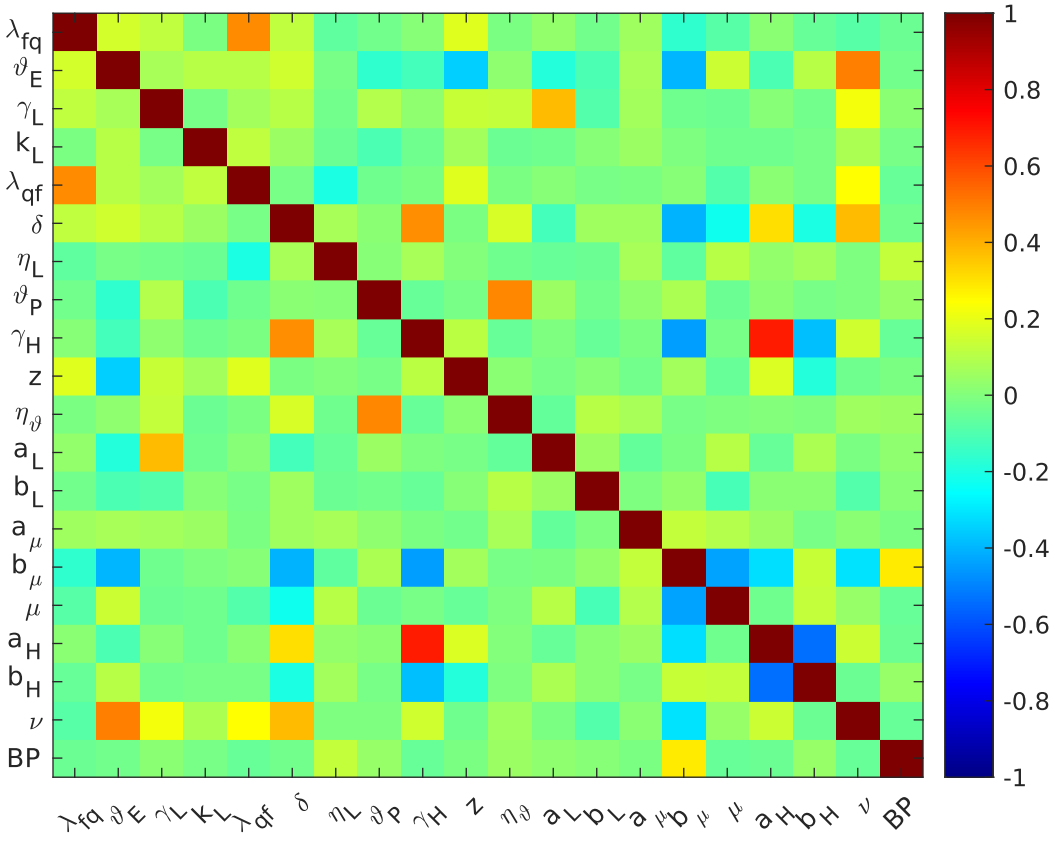
2.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4394'	'0.5123'	'0.4759'	'0.8139'	'0.0834'
\vartheta_E	'0.125'	'0.1433'	'0.1341'	'0.2518'	'0.0709'
\gamma_L	'0.1748'	'0.2483'	'0.2115'	'0.2934'	'0.083'
k_L	'5.199'	'5.738'	'5.4685'	'5.3803'	'0.0661'
\lambda_{qf}	'0.5316'	'0.608'	'0.5698'	'0.5997'	'0.0844'
\delta	'0.0193'	'0.0313'	'0.0253'	'0.15'	'0.1019'
\eta_L	'0.89'	'0.978'	'0.934'	'0.9997'	'0.0833'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0415'
\gamma_H	'0.5498'	'0.637'	'0.5934'	'1'	'0.1157'
z	'12.7432'	'15.0107'	'13.877'	'23.3693'	'0.0835'
\eta_\vartheta	'0.6756'	'0.7232'	'0.6994'	'0.8262'	'0.0658'
a_L	'3.5867'	'4.6555'	'4.1211'	'2.1282'	'0.0802'
b_L	'1.3833'	'2.4747'	'1.929'	'1.0002'	'0.0752'
a_\mu	'14.8529'	'15'	'14.9997'	'15'	'0.0418'
b_\mu	'4.1712'	'4.747'	'4.4591'	'2.9654'	'0.0873'
\mu	'0.9618'	'1'	'0.9997'	'1'	'0.0671'
a_H	'14.0544'	'15'	'14.6805'	'15'	'0.1164'
b_H	'4.5027'	'5.4905'	'4.9966'	'6.2579'	'0.0985'
\nu	'457.162'	'491.4646'	'474.3133'	'499.9921'	'0.0901'
BP	'81.9032'	'82.072'	'81.9876'	'83.5'	'0.0382'

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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0.6
0.4
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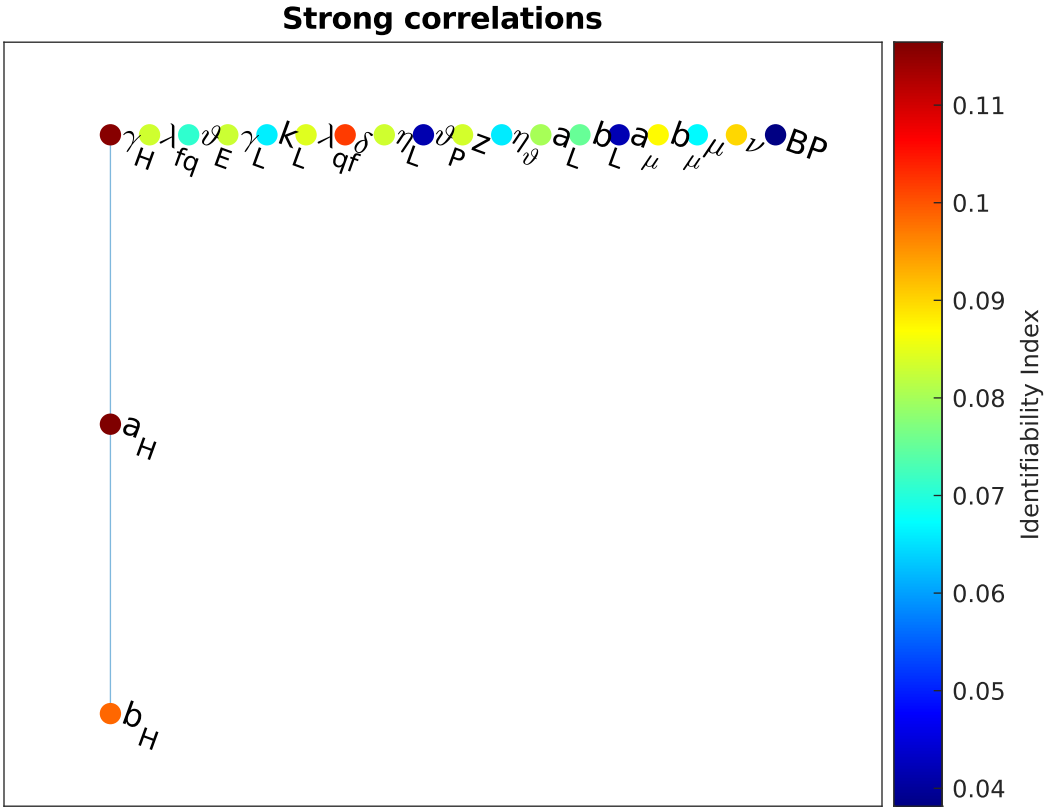
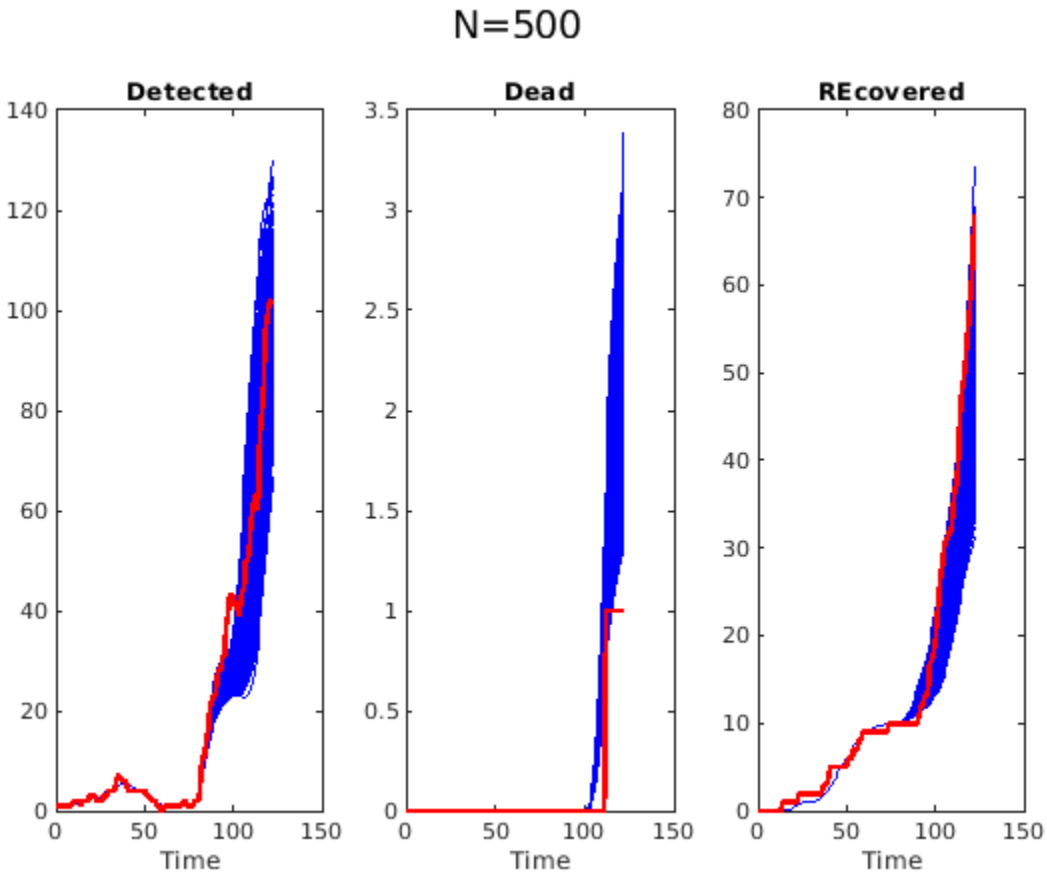
-0.4
-0.6
-0.8
-1


Strong correlations
γ_H λ_{fq} ϑ_E γ_L k_L λ_{qf} δ η_L ϑ_P z η_ϑ a_L b_L a_μ b_μ μ ν BP
a_H
b_H
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
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 data123 to the 150. The status of the validation is: COMPLETED.

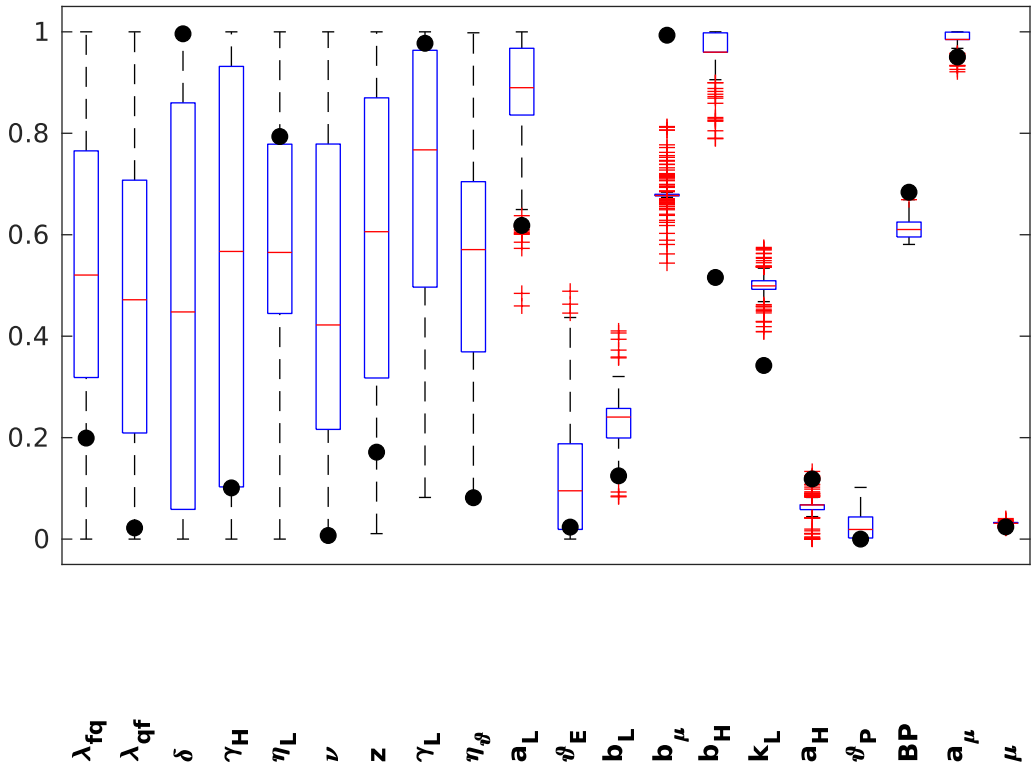
The number of estimations needed to perform the validation was1000.

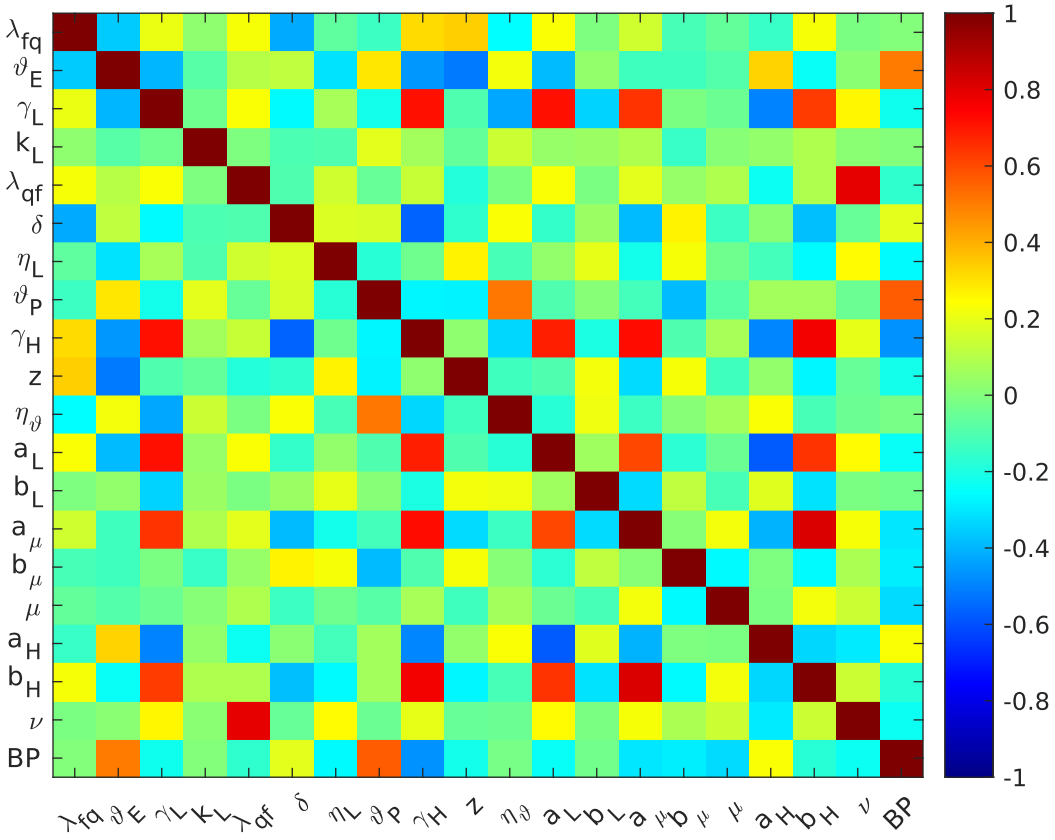
3.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4695'	'0.5716'	'0.5205'	'0.1992'	'0.1174'
\vartheta_E	'0.0541'	'0.1383'	'0.0962'	'0.0237'	'0.1509'
\gamma_L	'0.7158'	'0.8189'	'0.7673'	'0.9774'	'0.202'
k_L	'5.296'	'5.6886'	'5.4923'	'4.0805'	'0.063'
\lambda_{qf}	'0.4131'	'0.5305'	'0.4718'	'0.0221'	'0.1343'
\delta	'0.0562'	'0.0782'	'0.0672'	'0.1494'	'0.1602'
\eta_L	'0.5147'	'0.6155'	'0.5651'	'0.7936'	'0.1138'
\vartheta_P	'0.0093'	'0.0288'	'0.019'	'0'	'0.1064'
\gamma_H	'0.4935'	'0.6406'	'0.5671'	'0.1009'	'0.2436'
z	'16.3732'	'19.9857'	'18.1794'	'5.1423'	'0.143'
\eta_\vartheta	'0.5287'	'0.6127'	'0.5707'	'0.0816'	'0.122'
a_L	'12.7807'	'14.1343'	'13.4575'	'9.6567'	'0.2039'
b_L	'3.9254'	'4.8106'	'4.368'	'2.7462'	'0.0876'
a_\mu	'13.7655'	'15'	'14.7881'	'14.3044'	'0.1945'
b_\mu	'9.9262'	'11.0399'	'10.483'	'14.9064'	'0.1005'
\mu	'0.0222'	'0.04'	'0.0311'	'0.0241'	'0.0606'
a_H	'1.3274'	'2.5599'	'1.9436'	'2.6596'	'0.1346'
b_H	'13.5059'	'15'	'14.4369'	'8.221'	'0.2037'
\nu	'180.2779'	'241.8706'	'211.0742'	'3.5413'	'0.1382'
BP	'123.1302'	'123.8698'	'123.5'	'128.5'	'0.1111'

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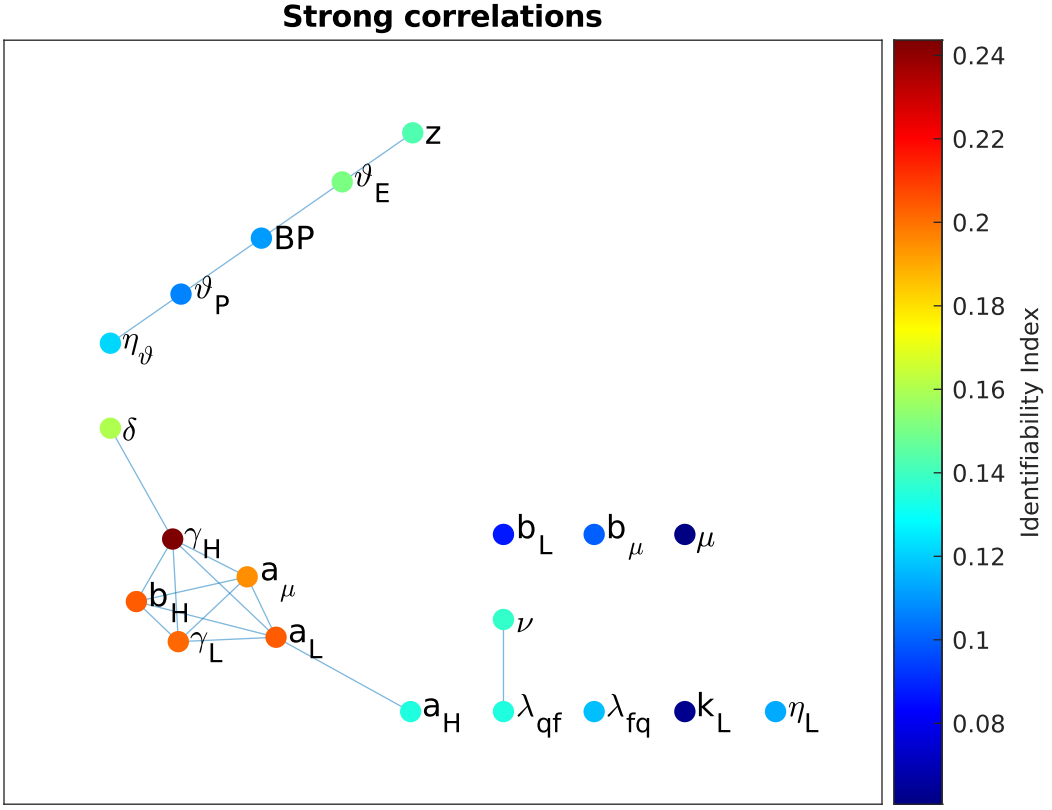
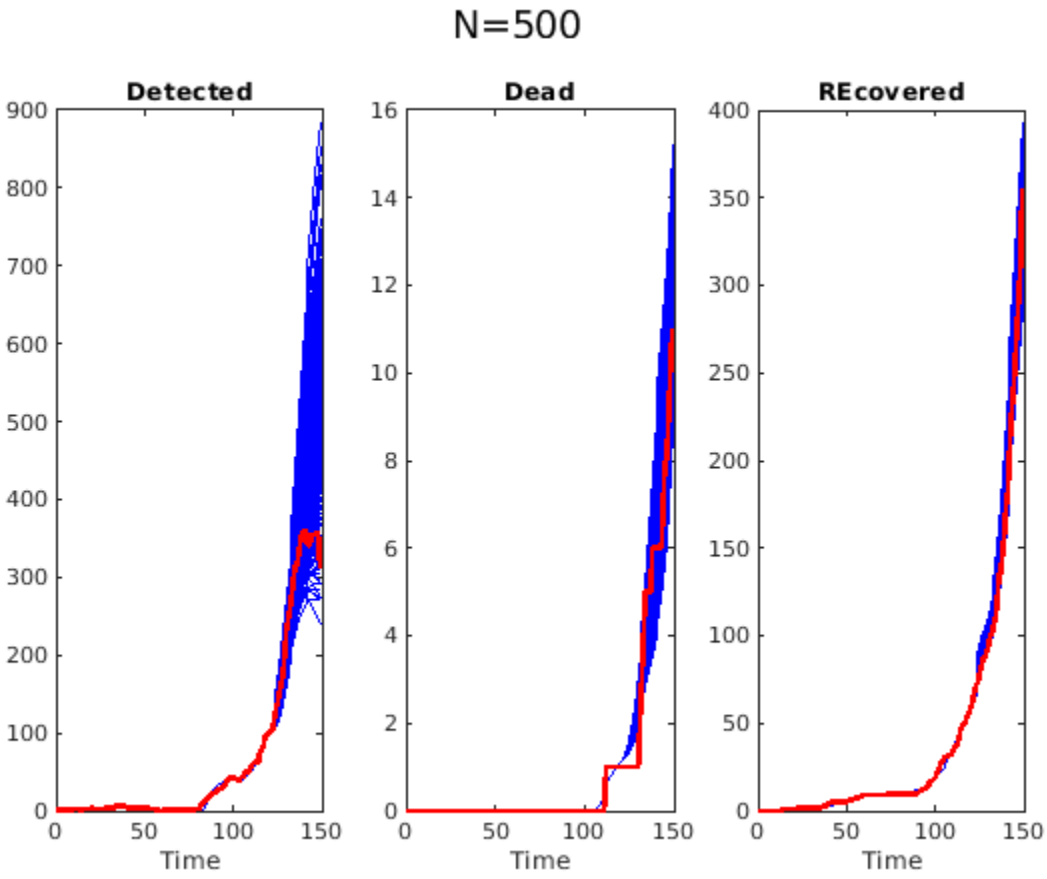
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
z
ϑ_E
BP
ϑ_P
η_ϑ
δ
γ_H
a_μ
b_H
γ_L
a_L
a_H
b_L
b_μ
μ
ν
λ_{qf}
λ_{fq}
k_L
η_L
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
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 data150 to the 181. The status of the validation is: COMPLETED.

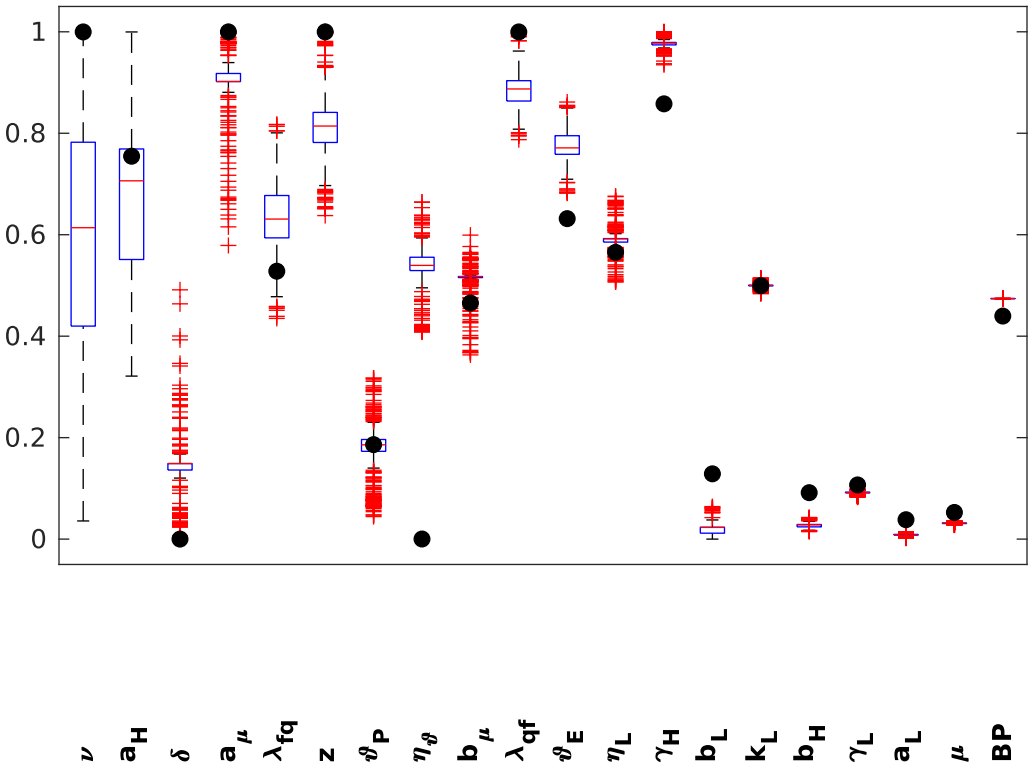
The number of estimations needed to perform the validation was1000.

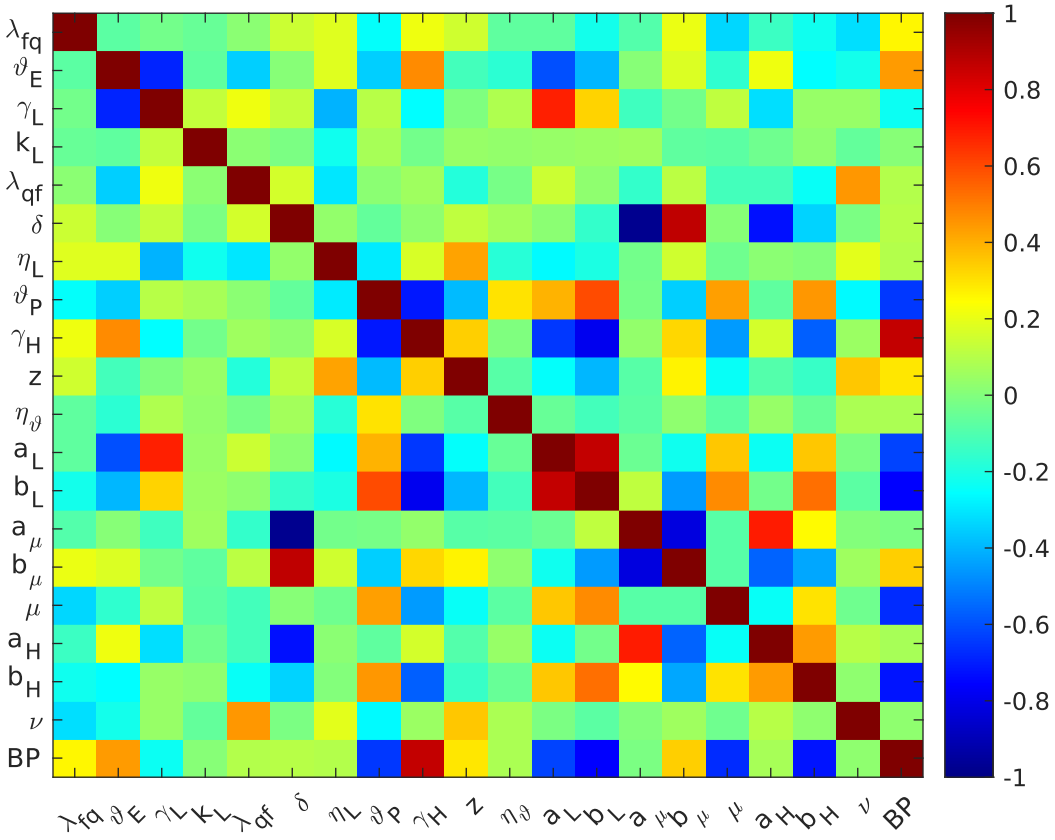
4.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.6136'	'0.6481'	'0.6309'	'0.5281'	'0.0801'
\vartheta_E	'0.7592'	'0.7831'	'0.7712'	'0.6317'	'0.1238'
\gamma_L	'0.0859'	'0.097'	'0.0914'	'0.1068'	'0.1049'
k_L	'5.4487'	'5.5515'	'5.5001'	'5.4956'	'0.0443'
\lambda_{qf}	'0.8804'	'0.8942'	'0.8873'	'0.9998'	'0.0672'
\delta	'0.0151'	'0.0296'	'0.0223'	'0'	'0.1605'
\eta_L	'0.5753'	'0.6083'	'0.5918'	'0.5653'	'0.0836'
\vartheta_P	'0.1697'	'0.2019'	'0.1858'	'0.1862'	'0.1503'
\gamma_H	'0.9654'	'0.9901'	'0.9777'	'0.858'	'0.1769'
z	'23.9911'	'24.8613'	'24.4262'	'29.9952'	'0.089'
\eta_\vartheta	'0.523'	'0.556'	'0.5395'	'0.0002'	'0.0619'
a_L	'1.0262'	'1.2074'	'1.1168'	'1.535'	'0.1672'
b_L	'1.1559'	'1.4904'	'1.3232'	'2.8017'	'0.1812'
a_\mu	'12.8806'	'14.3737'	'13.6272'	'14.9973'	'0.1617'
b_\mu	'7.8823'	'8.6077'	'8.245'	'7.516'	'0.1576'
\mu	'0.0302'	'0.0328'	'0.0315'	'0.0526'	'0.0922'
a_H	'10.53'	'11.2449'	'10.8874'	'11.5658'	'0.1415'
b_H	'1.358'	'1.4275'	'1.3927'	'2.2812'	'0.1322'
\nu	'291.308'	'322.5201'	'306.9141'	'499.8772'	'0.086'
BP	'150.3963'	'150.6037'	'150.5'	'148.4999'	'0.181'

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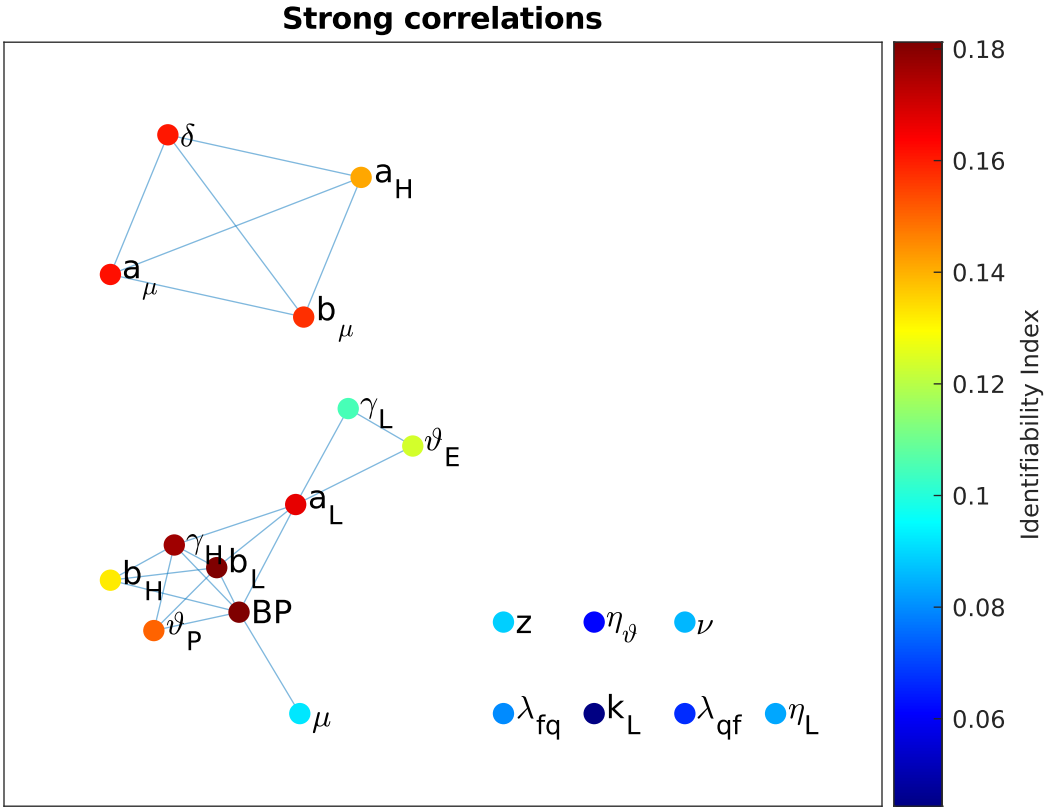
-0.2
-0.4
-0.6
-0.8
-1


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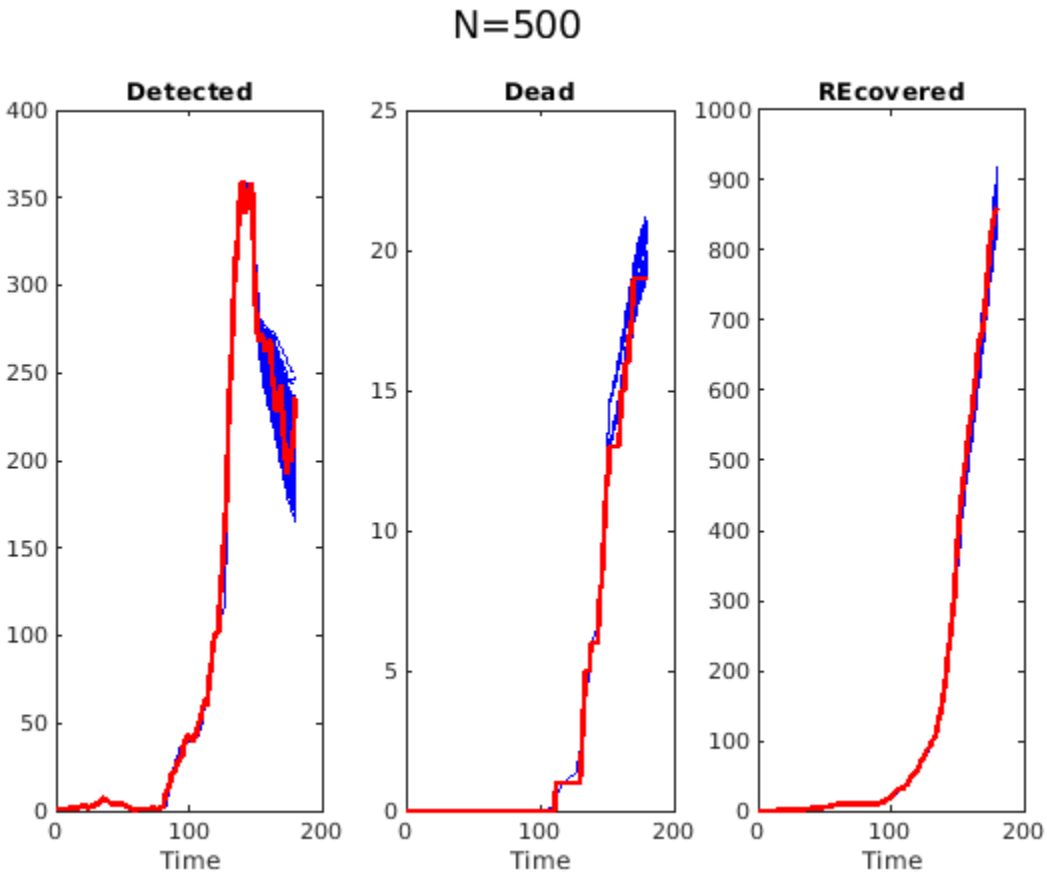
0.16
0.14
0.12
0.1
0.08
0.06
Identifiability Index

4.4. Uncertainty analisys



Chapter 5. Extension number5

5.1. Basic information

The extension to be validated consists of the time series from the data181 to the 208. The status of the validation is: COMPLETED.

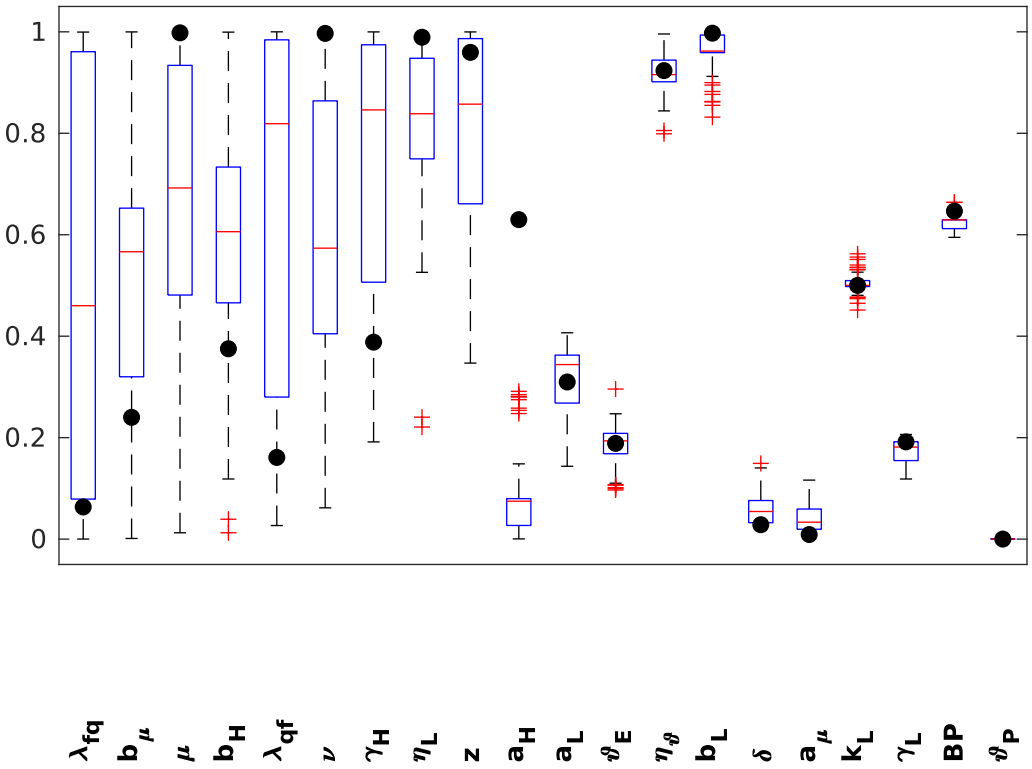
The number of estimations needed to perform the validation was5000.

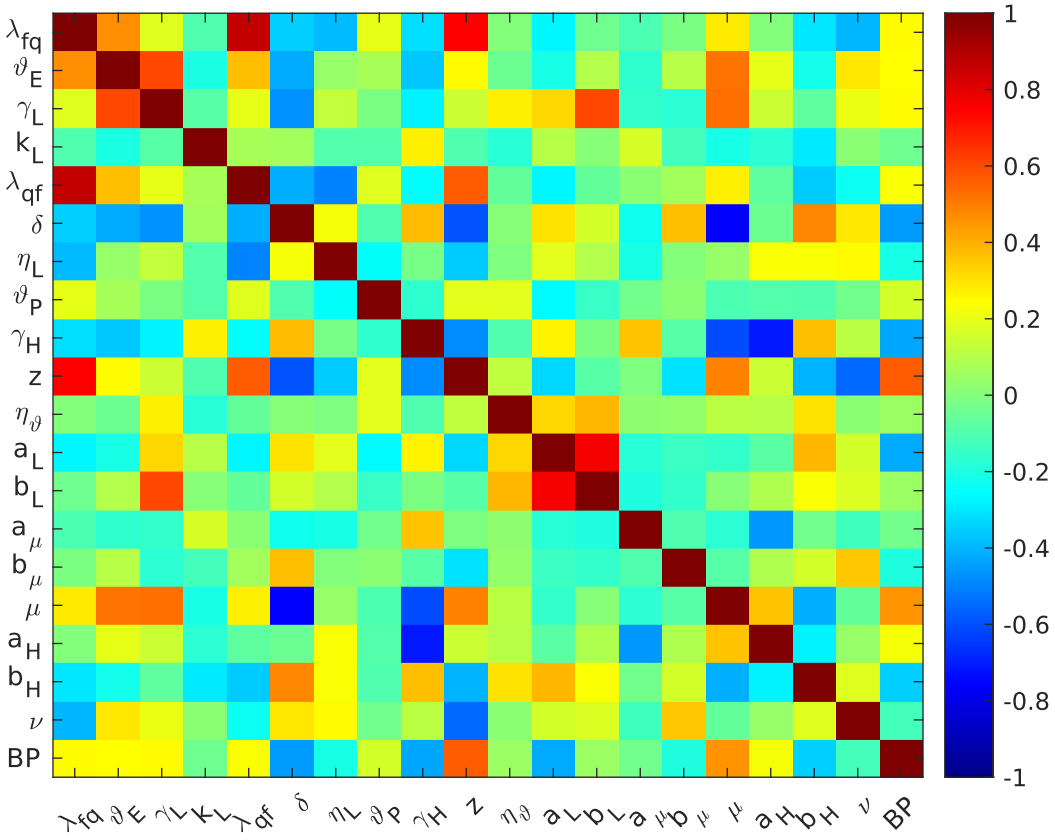
5.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3455'	'0.5747'	'0.4601'	'0.0633'	'0.2305'
\vartheta_E	'0.1768'	'0.2105'	'0.1937'	'0.1887'	'0.1277'
\gamma_L	'0.1737'	'0.1891'	'0.1814'	'0.1916'	'0.1304'
k_L	'5.1572'	'5.8448'	'5.501'	'5.5013'	'0.0928'
\lambda_{qf}	'0.7104'	'0.9274'	'0.8189'	'0.161'	'0.2218'
\delta	'0'	'0.0184'	'0.0082'	'0.0043'	'0.1874'
\eta_L	'0.7463'	'0.9307'	'0.8385'	'0.9893'	'0.1606'
\vartheta_P	'0'	'0.0017'	'0.0002'	'0'	'0.0555'
\gamma_H	'0.767'	'0.9252'	'0.8461'	'0.3882'	'0.1988'
z	'23.9509'	'27.4945'	'25.7227'	'28.7857'	'0.2267'
\eta_\vartheta	'0.8735'	'0.9577'	'0.9156'	'0.9236'	'0.0964'
a_L	'5.3965'	'6.2369'	'5.8167'	'5.3357'	'0.1316'
b_L	'13.3937'	'15'	'14.4687'	'14.963'	'0.1494'
a_\mu	'1.34'	'1.5936'	'1.4668'	'1.1259'	'0.0681'
b_\mu	'7.8405'	'10.0208'	'8.9307'	'4.3602'	'0.1347'
\mu	'0.6063'	'0.7781'	'0.6922'	'0.998'	'0.2313'
a_H	'1.0307'	'3.0617'	'2.0462'	'9.8165'	'0.1544'
b_H	'8.52'	'10.4483'	'9.4842'	'6.2525'	'0.1581'
\nu	'246.6643'	'326.8799'	'286.7721'	'498.4383'	'0.163'
BP	'186.2549'	'186.7451'	'186.5'	'187.5'	'0.1008'

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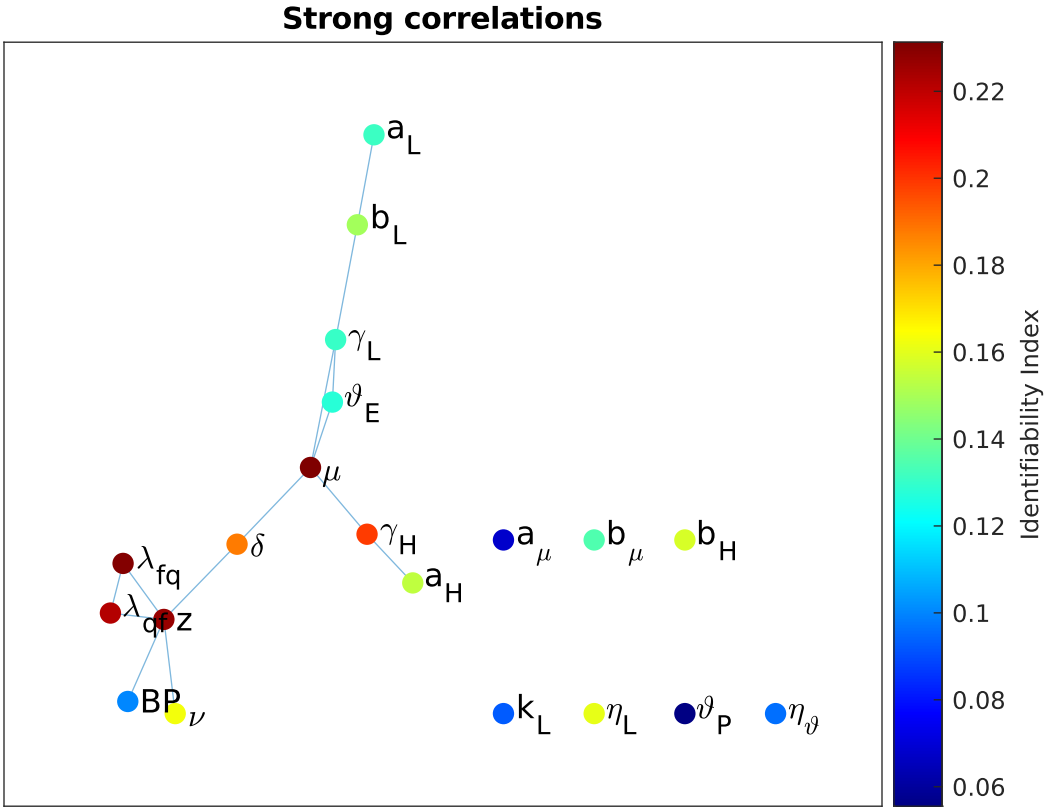
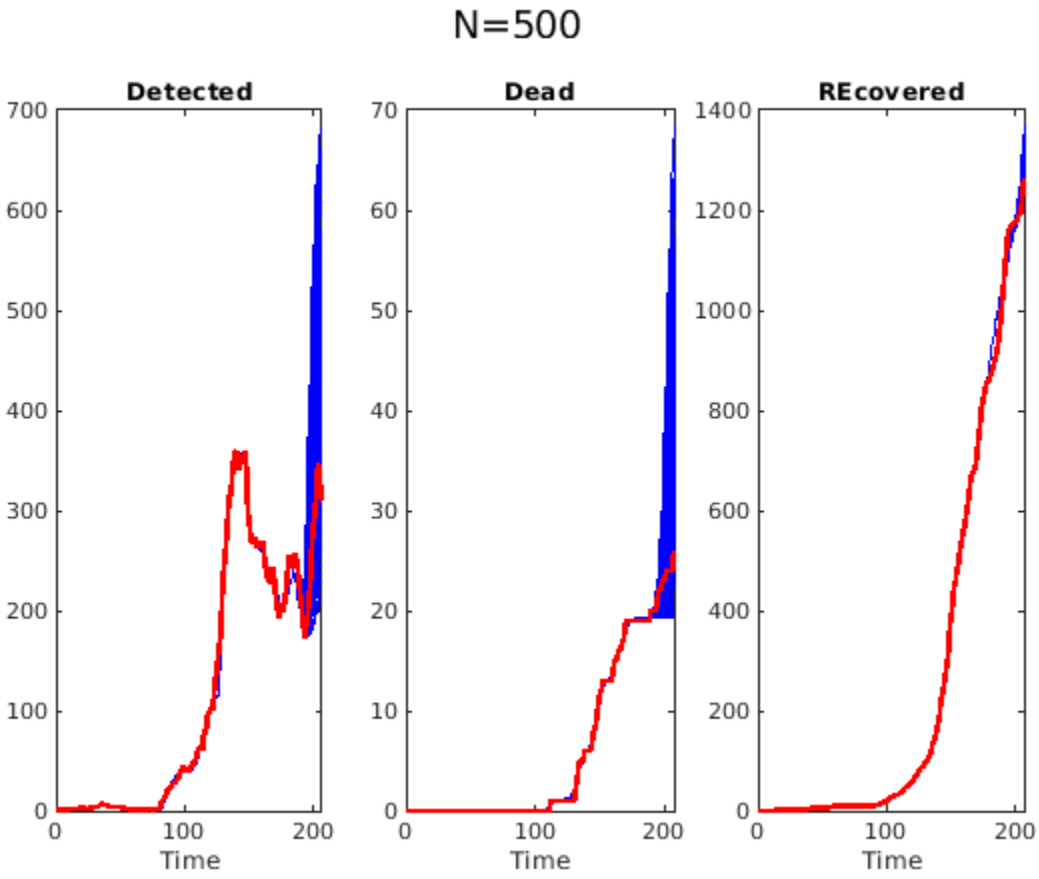
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
a_L
b_L
γ_L
ϑ_E
μ
γ_H
a_H
δ
λ_fq
λ_qfz
BP
ν
a_μ
b_μ
b_H
k_L
η_L
ϑ_P
η_ϑ
0.22
0.2
0.18
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 data208 to the 255. The status of the validation is: COMPLETED.

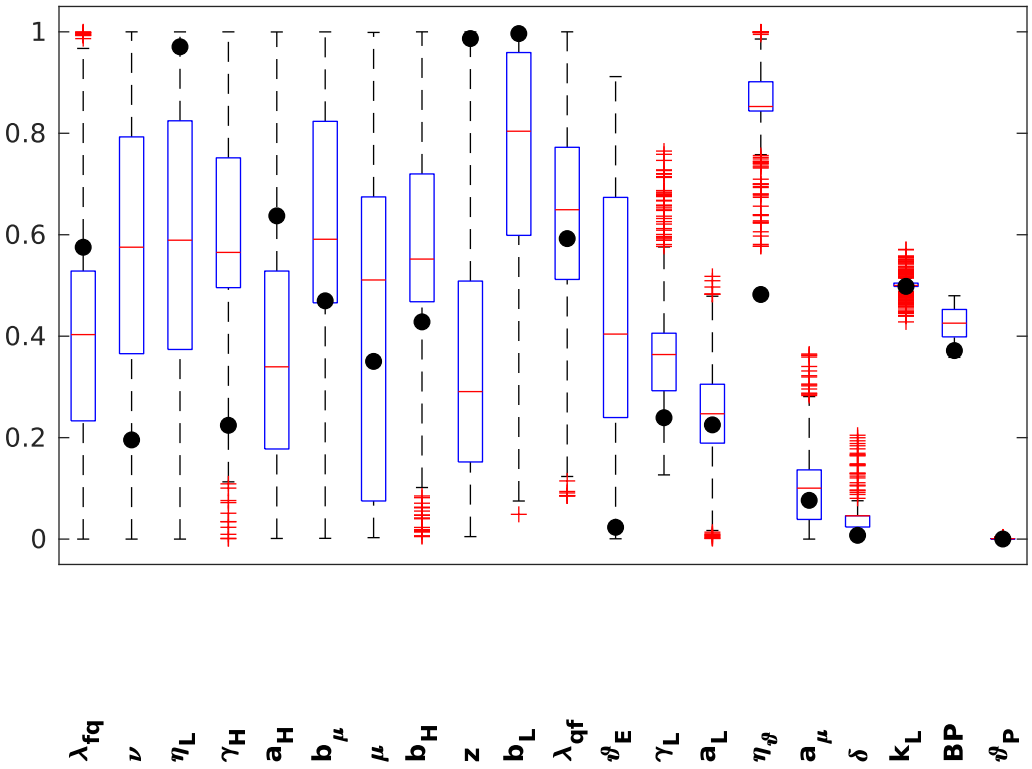
The number of estimations needed to perform the validation was1000.

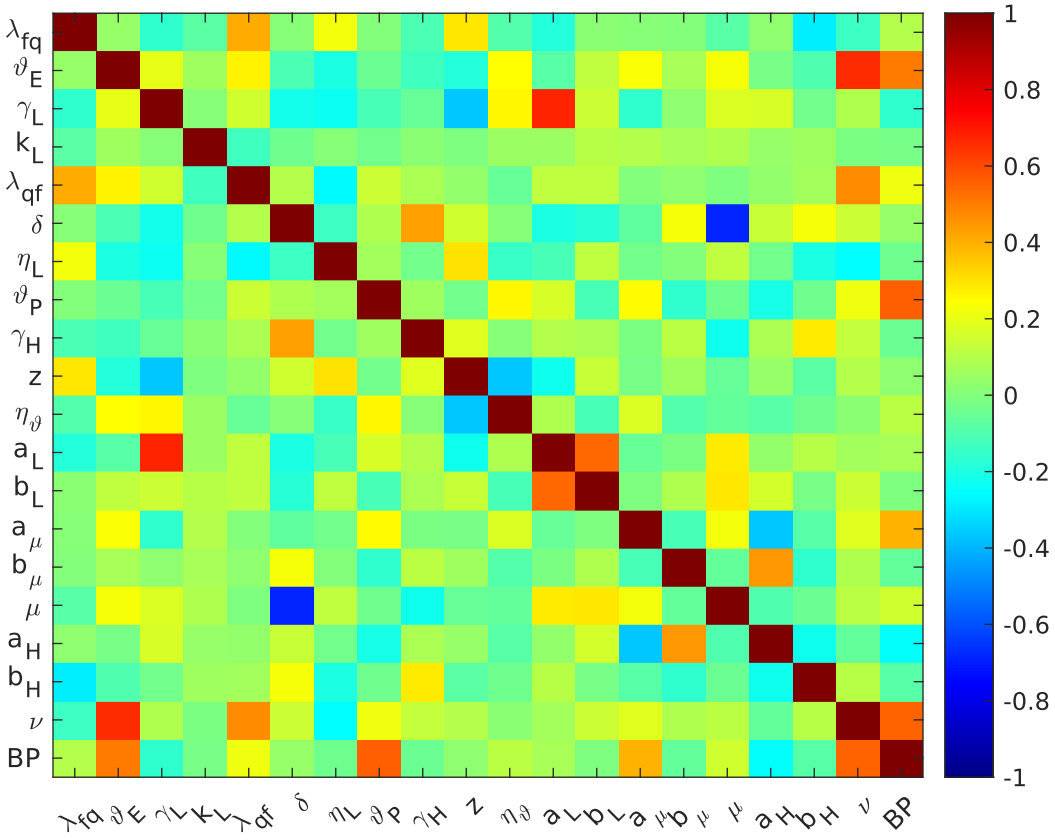
6.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3712'	'0.4351'	'0.4031'	'0.5753'	'0.0854'
\vartheta_E	'0.3716'	'0.4367'	'0.4042'	'0.0233'	'0.1264'
\gamma_L	'0.3337'	'0.394'	'0.3638'	'0.2393'	'0.1101'
k_L	'5.372'	'5.6287'	'5.5004'	'5.4838'	'0.0515'
\lambda_{qf}	'0.6184'	'0.6802'	'0.6493'	'0.5924'	'0.0897'
\delta	'0.0004'	'0.0134'	'0.0069'	'0.0011'	'0.1211'
\eta_L	'0.5502'	'0.6283'	'0.5892'	'0.9705'	'0.0954'
\vartheta_P	'0'	'0.0015'	'0.0008'	'0.0002'	'0.0704'
\gamma_H	'0.5344'	'0.5959'	'0.5652'	'0.2243'	'0.0827'
z	'7.5851'	'9.8623'	'8.7237'	'29.6017'	'0.0958'
\eta_\vartheta	'0.8287'	'0.8769'	'0.8528'	'0.4822'	'0.0773'
a_L	'4.2284'	'4.6896'	'4.459'	'4.153'	'0.1059'
b_L	'11.7946'	'12.7192'	'12.2569'	'14.9515'	'0.1018'
a_\mu	'2.2134'	'2.5988'	'2.4061'	'2.0694'	'0.0697'
b_\mu	'8.7903'	'9.7602'	'9.2753'	'7.5763'	'0.0832'
\mu	'0.4669'	'0.5548'	'0.5108'	'0.3503'	'0.1197'
a_H	'5.3112'	'6.1984'	'5.7548'	'9.9216'	'0.088'
b_H	'8.2837'	'9.173'	'8.7284'	'6.9951'	'0.0844'
\nu	'268.6646'	'306.7689'	'287.7168'	'97.7643'	'0.1325'
BP	'212.1727'	'212.8273'	'212.5'	'208.5'	'0.1092'

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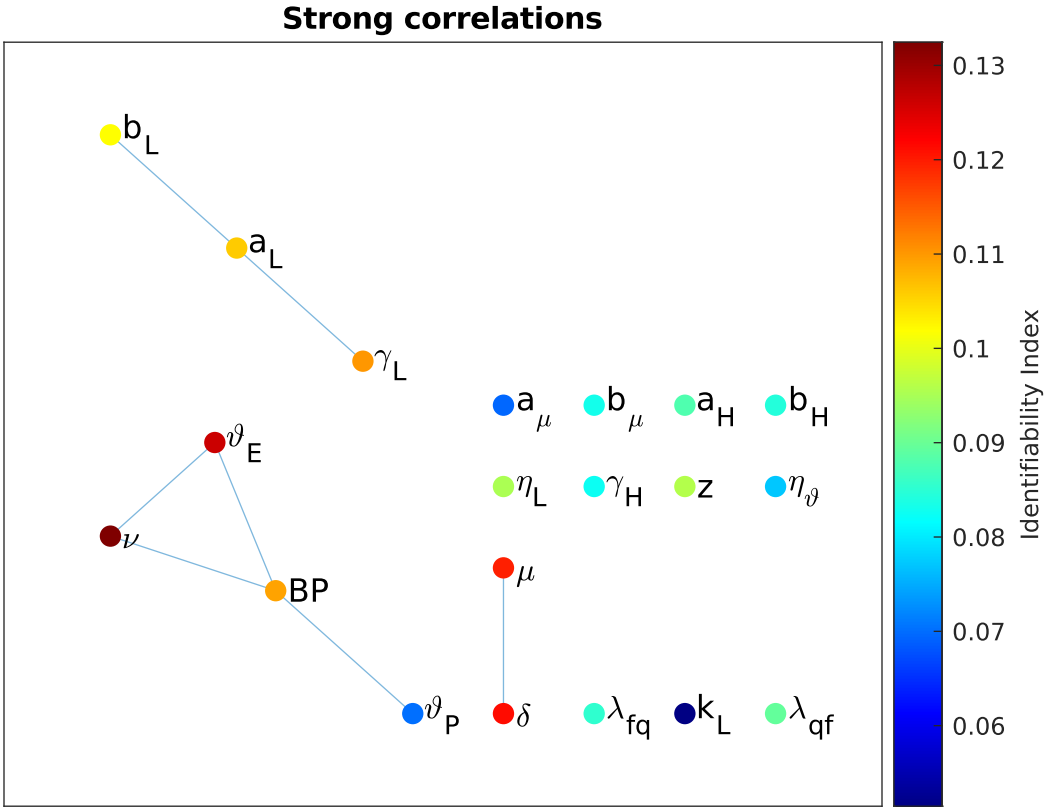
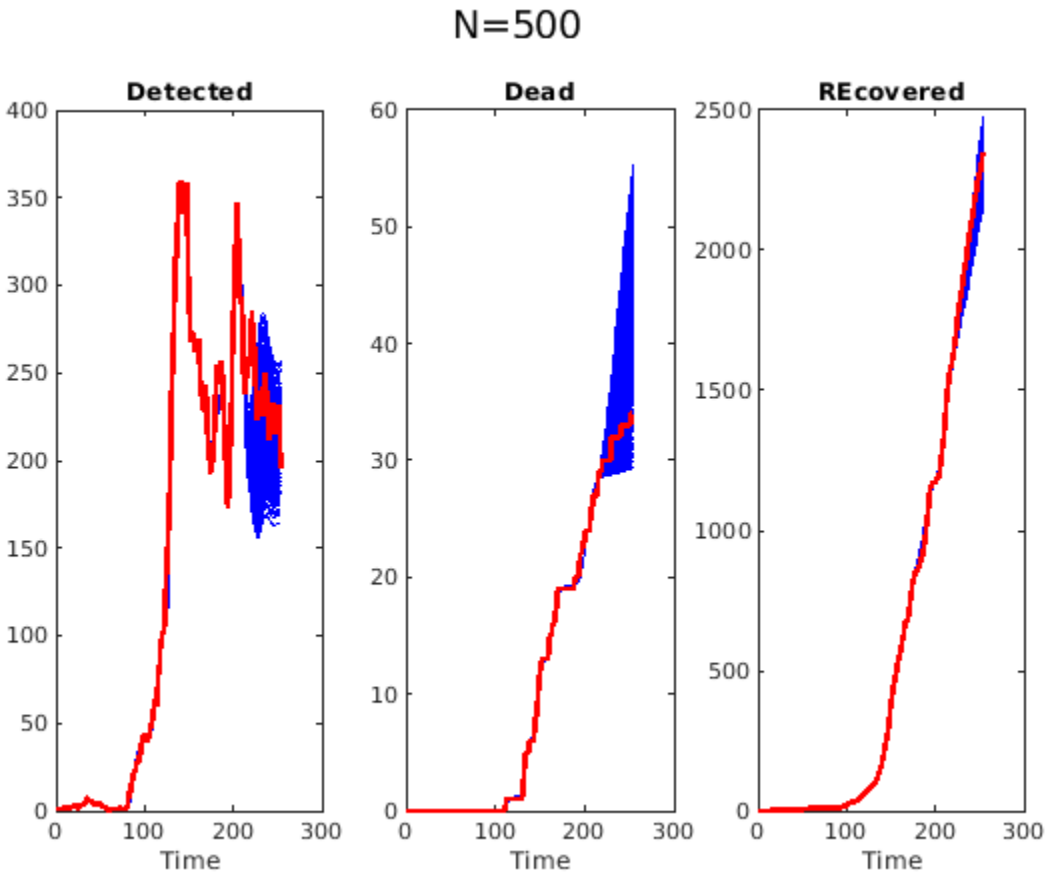
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
b_L
a_L
γ_L
ϑ_E
ν
BP
ϑ_P
a_μ
b_μ
a_H
b_H
η_L
γ_H
z
η_ϑ
μ
δ
λ_fq
k_L
λ_qf
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
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 data255 to the 301. The status of the validation is: COMPLETED.

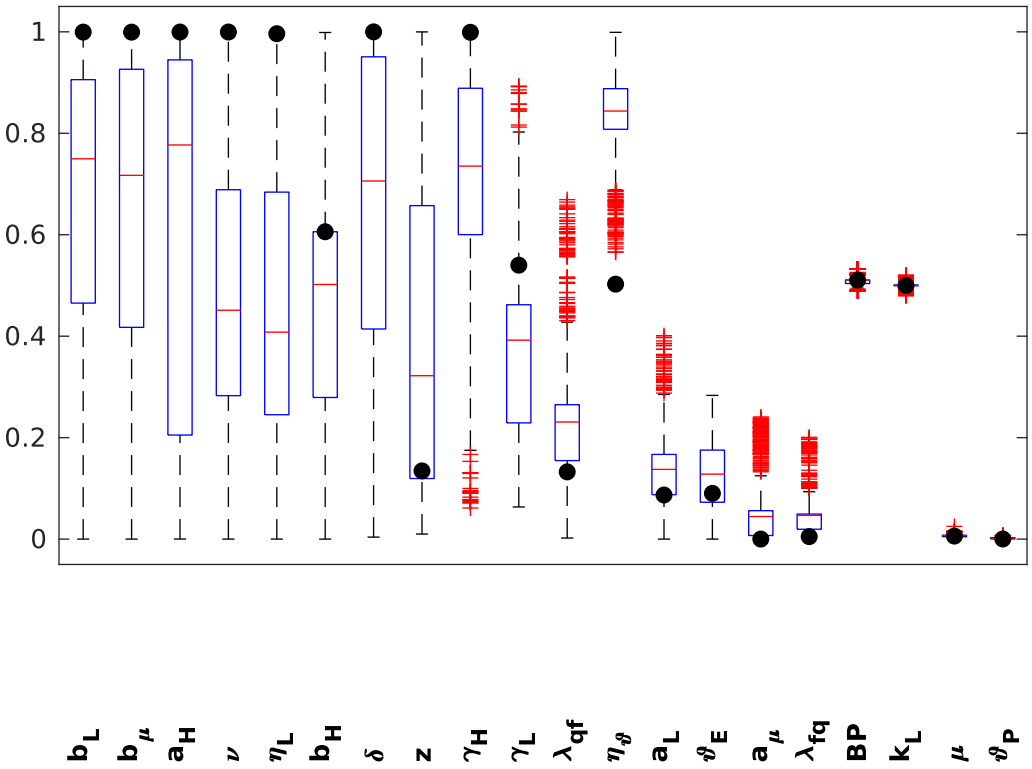
The number of estimations needed to perform the validation was1000.

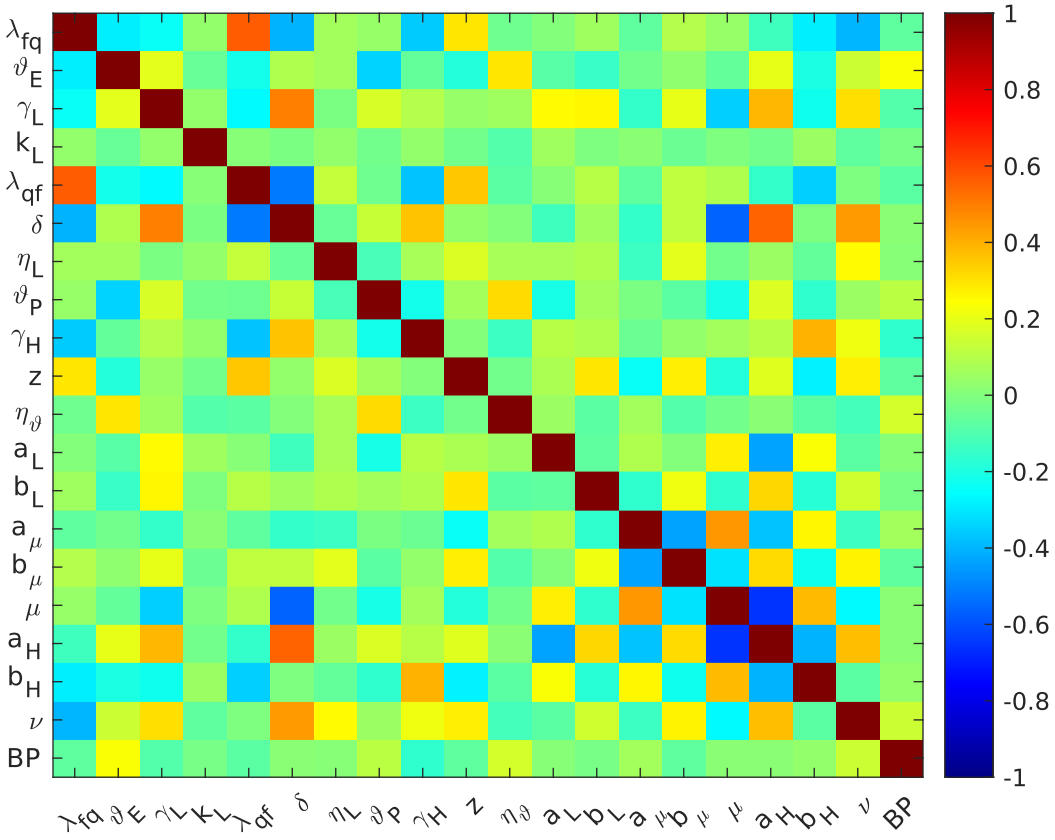
7.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.029'	'0.0643'	'0.0467'	'0.0049'	'0.0984'
\vartheta_E	'0.1221'	'0.1341'	'0.1281'	'0.0901'	'0.0672'
\gamma_L	'0.3752'	'0.4091'	'0.3922'	'0.54'	'0.0897'
k_L	'5.4251'	'5.5756'	'5.5003'	'5.4988'	'0.0415'
\lambda_{qf}	'0.2057'	'0.2559'	'0.2308'	'0.1325'	'0.1188'
\delta	'0.1016'	'0.1102'	'0.1059'	'0.15'	'0.1429'
\eta_L	'0.3826'	'0.4334'	'0.408'	'0.9963'	'0.0715'
\vartheta_P	'0.0011'	'0.0016'	'0.0014'	'0.0002'	'0.0567'
\gamma_H	'0.7139'	'0.7567'	'0.7353'	'0.9991'	'0.0828'
z	'8.8066'	'10.5178'	'9.6622'	'4.0326'	'0.0923'
\eta_\vartheta	'0.829'	'0.8587'	'0.8438'	'0.5026'	'0.0621'
a_L	'2.6426'	'3.2055'	'2.9241'	'2.2167'	'0.0733'
b_L	'11.1263'	'11.8641'	'11.4952'	'14.9929'	'0.0829'
a_\mu	'1.3959'	'1.8502'	'1.623'	'1.0008'	'0.0781'
b_\mu	'10.6353'	'11.4422'	'11.0387'	'14.9911'	'0.0929'
\mu	'0'	'0.0318'	'0.0074'	'0.0059'	'0.1175'
a_H	'11.4275'	'12.3266'	'11.877'	'14.9942'	'0.1431'
b_H	'7.6972'	'8.3569'	'8.027'	'9.4823'	'0.0971'
\nu	'213.1877'	'237.9999'	'225.5938'	'499.8003'	'0.0968'
BP	'255.4001'	'255.5999'	'255.5'	'255.4997'	'0.0434'

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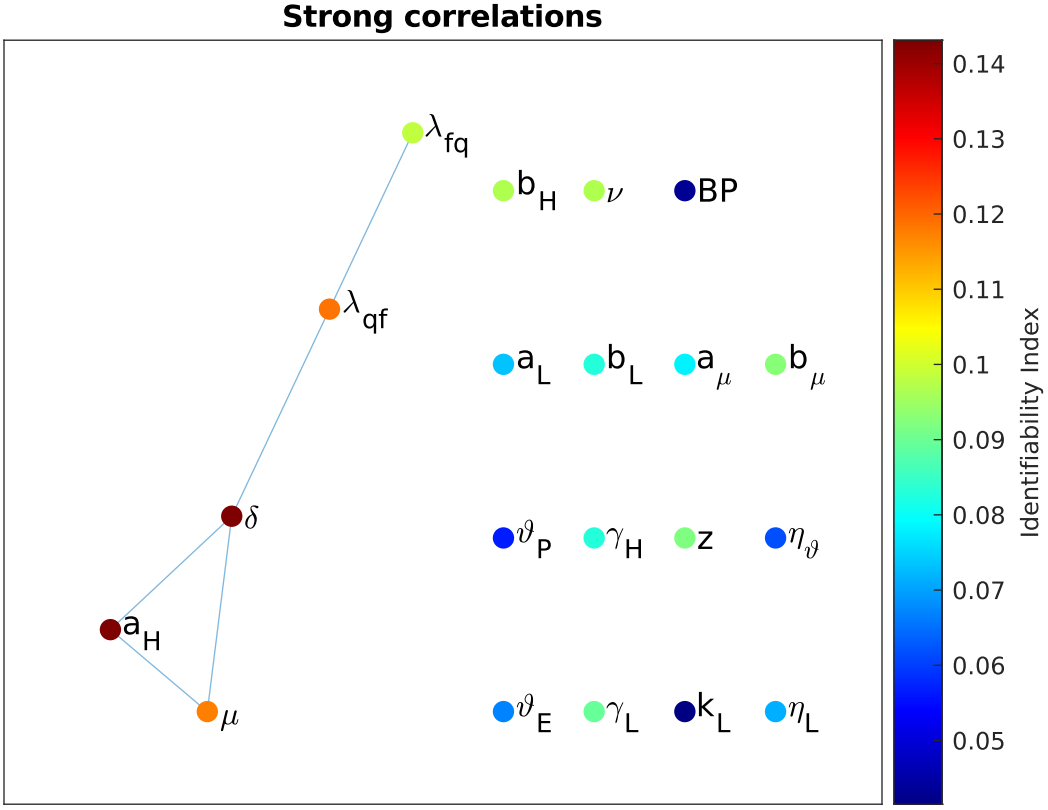
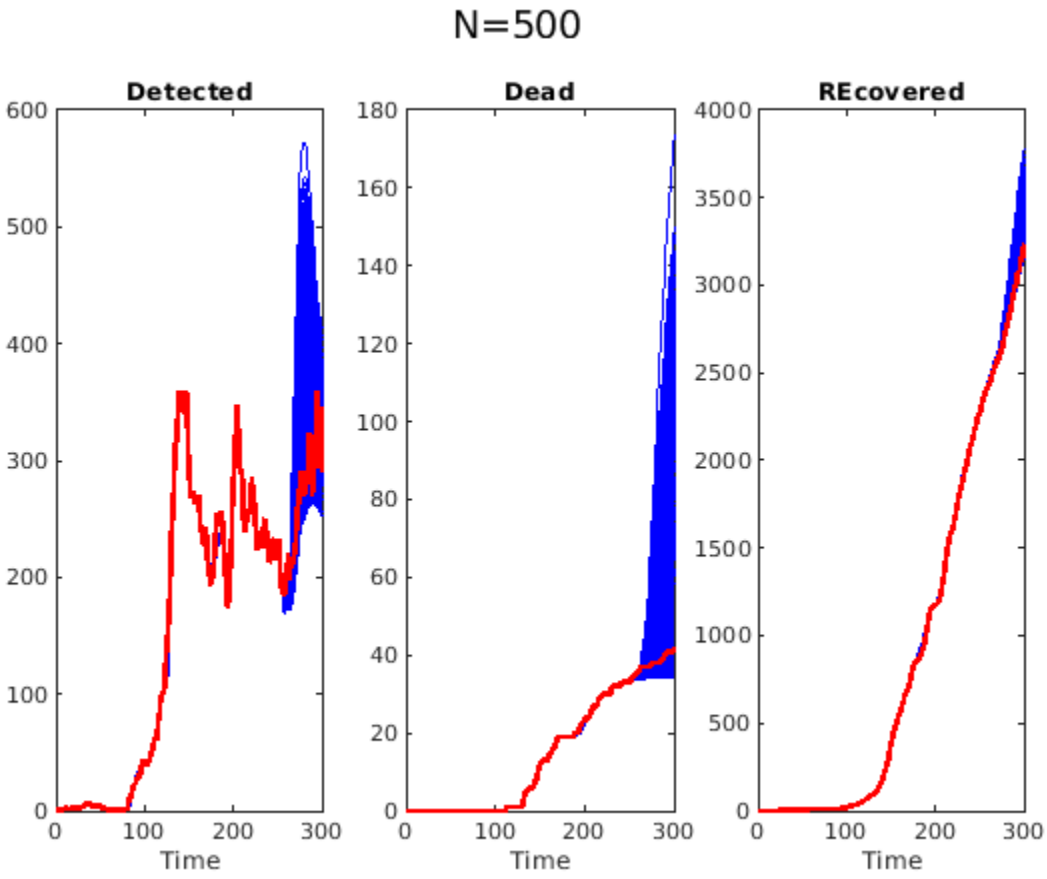
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
λ_{fq}
λ_{qf}
δ
a_H
μ
b_H
ν
BP
a_L
b_L
a_μ
b_μ
ϑ_P
γ_H
z
η_ϑ
ϑ_E
γ_L
k_L
η_L
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 data301 to the 347. The status of the validation is: COMPLETED.

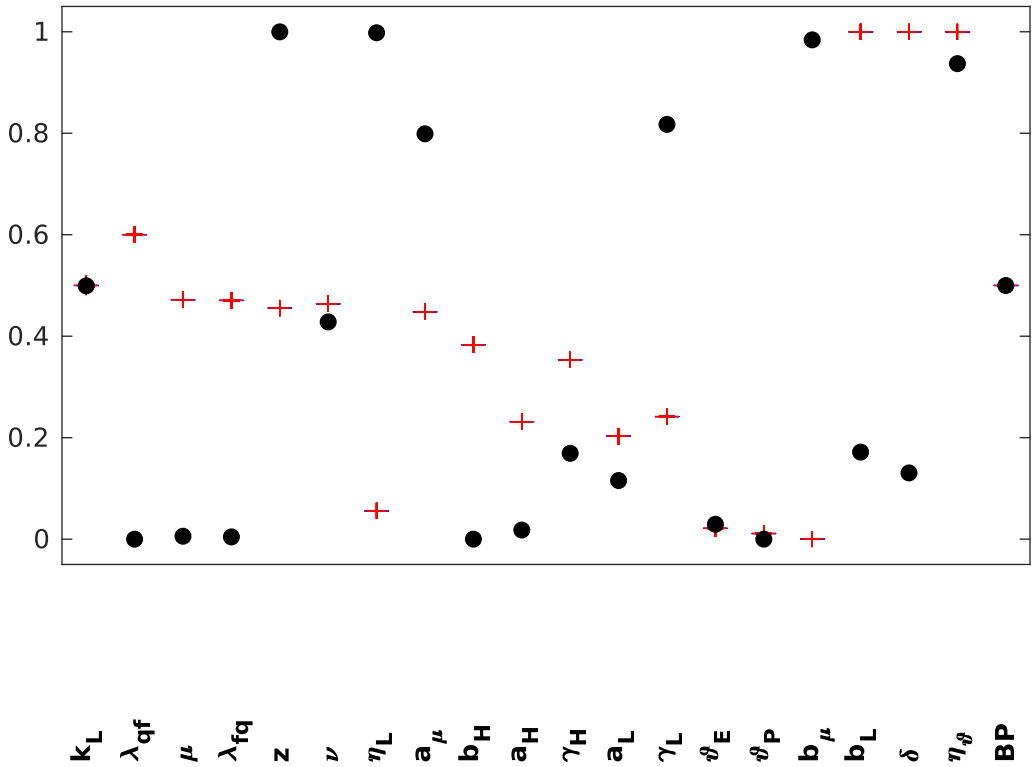
The number of estimations needed to perform the validation was1000.

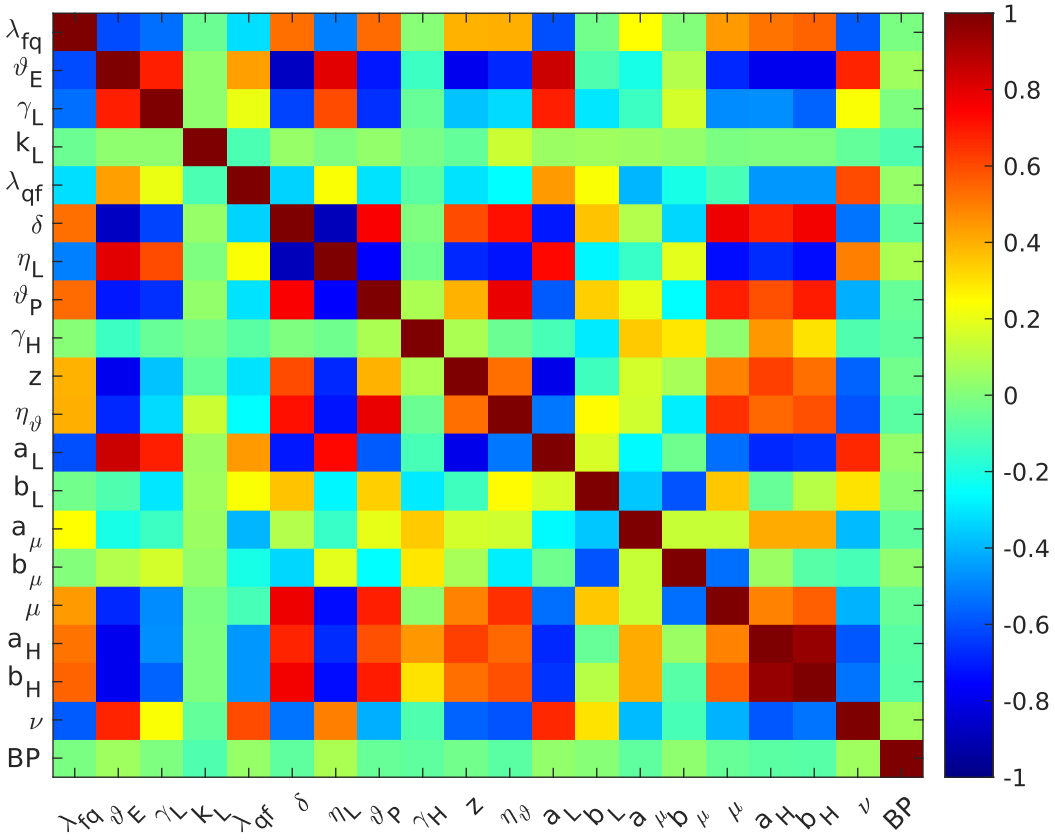
8.2. Estimated parameters with their intervals

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.4574'	'0.4839'	'0.4706'	'0.0044'	'0.2364'
\vartheta_E	'0.0125'	'0.0301'	'0.0213'	'0.0293'	'0.3082'
\gamma_L	'0.2234'	'0.2598'	'0.2416'	'0.8175'	'0.2196'
k_L	'5.4643'	'5.5358'	'5.5'	'5.4937'	'0.04'
\lambda_{qf}	'0.5873'	'0.613'	'0.6002'	'0'	'0.1196'
\delta	'0.1451'	'0.15'	'0.15'	'0.0196'	'0.3124'
\eta_L	'0.0265'	'0.0848'	'0.0557'	'0.998'	'0.3074'
\vartheta_P	'0.0107'	'0.0115'	'0.0111'	'0'	'0.2604'
\gamma_H	'0.3474'	'0.3592'	'0.3533'	'0.1692'	'0.0624'
z	'13.1578'	'14.174'	'13.6659'	'29.9952'	'0.2366'
\eta_\vartheta	'0.9856'	'1'	'0.9999'	'0.9372'	'0.2601'
a_L	'3.6933'	'3.9926'	'3.8429'	'2.6173'	'0.2993'
b_L	'14.7853'	'15'	'14.9979'	'3.4033'	'0.0988'
a_\mu	'7.1029'	'7.4377'	'7.2703'	'12.1847'	'0.0907'
b_\mu	'1'	'1.18'	'1.0017'	'14.7766'	'0.1003'
\mu	'0.4588'	'0.485'	'0.4719'	'0.0058'	'0.2401'
a_H	'4.1175'	'4.3654'	'4.2414'	'1.2515'	'0.2722'
b_H	'6.1944'	'6.5357'	'6.365'	'1.0003'	'0.3039'
\nu	'222.5286'	'241.2583'	'231.8935'	'214.088'	'0.2543'
BP	'300.9935'	'301.0065'	'301'	'300.9915'	'0.0374'

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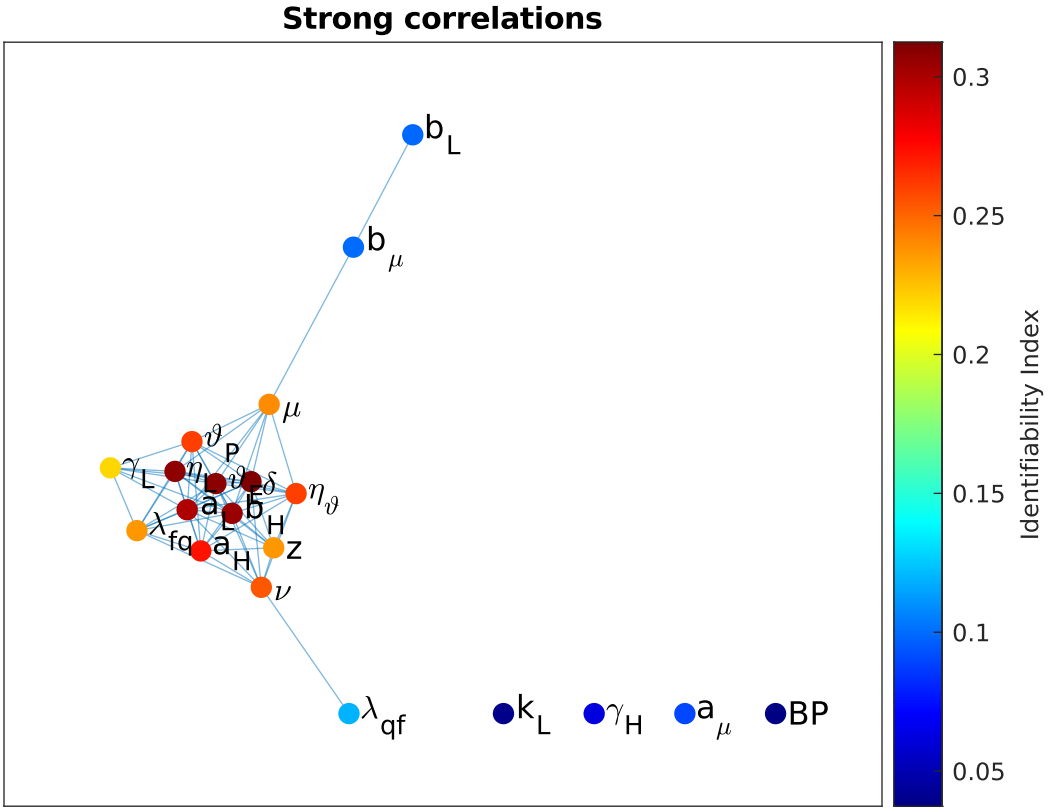
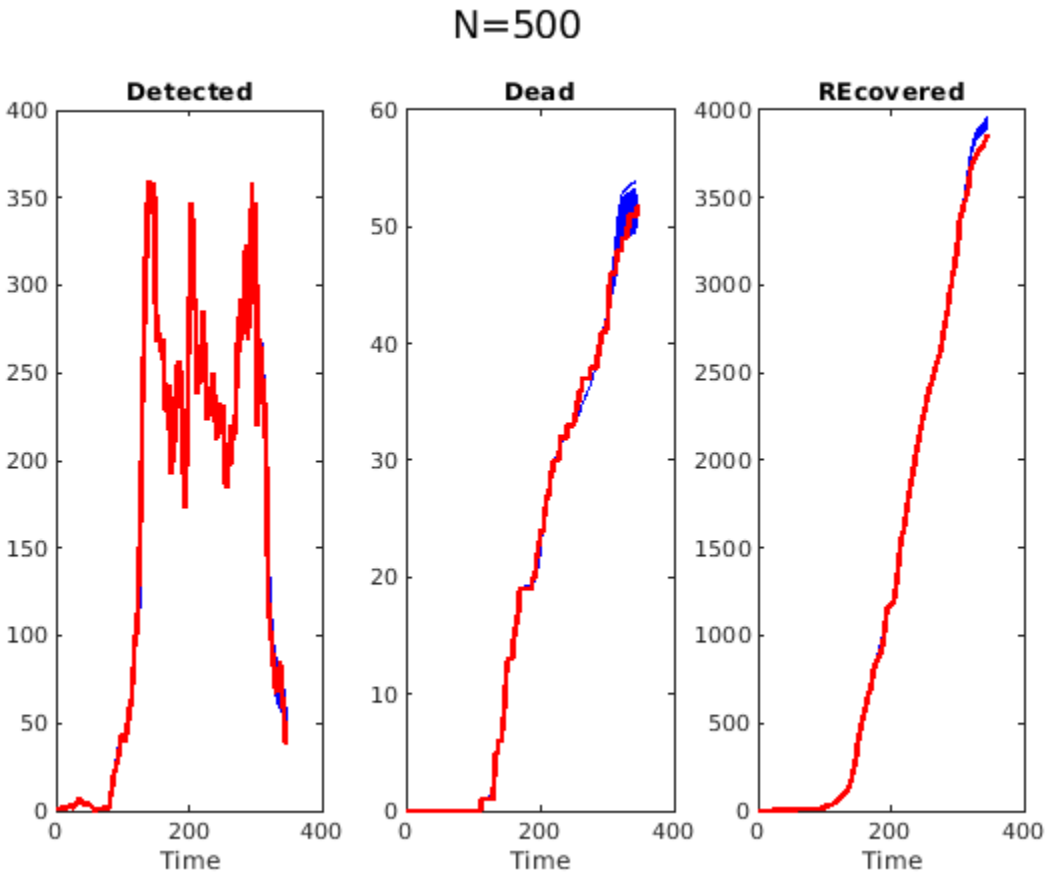
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
b L
b μ
μ
ϑ P
γ L
η L
ϑ
δ
η ϑ
a L
b H
λ fq
a H
z
ν
λ qf
k L
γ H
a μ
BP
0.3
0.25
0.2
0.15
0.1
0.05
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 data347 to the 379. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

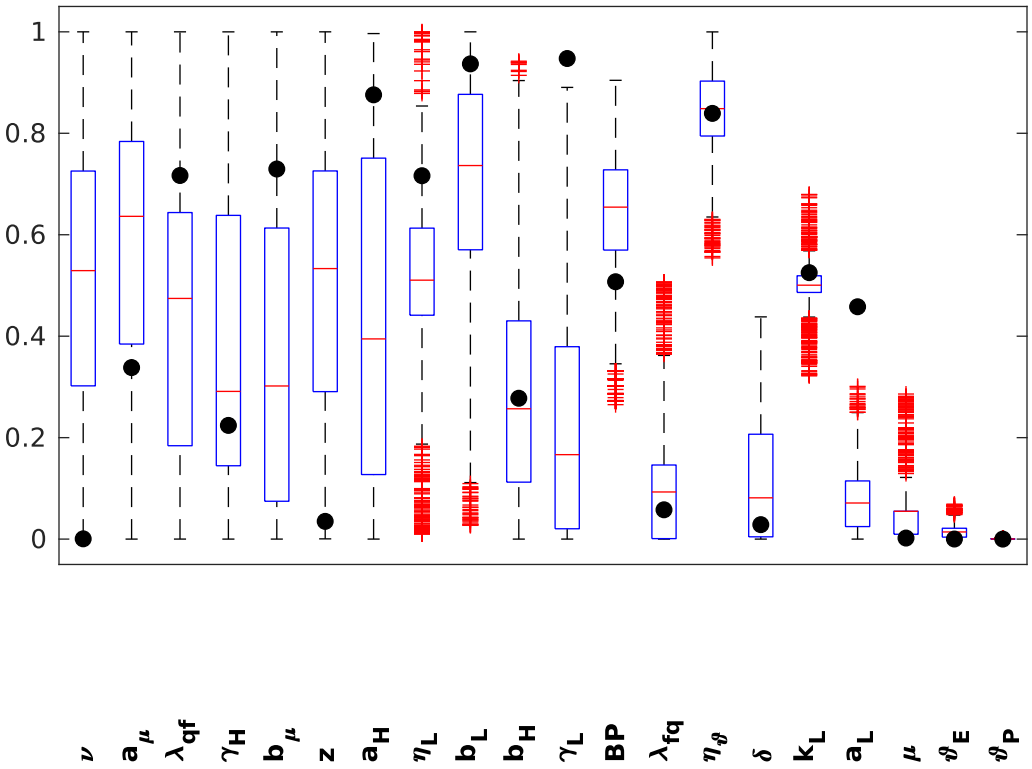
9.2. Estimated parameters with their intervals

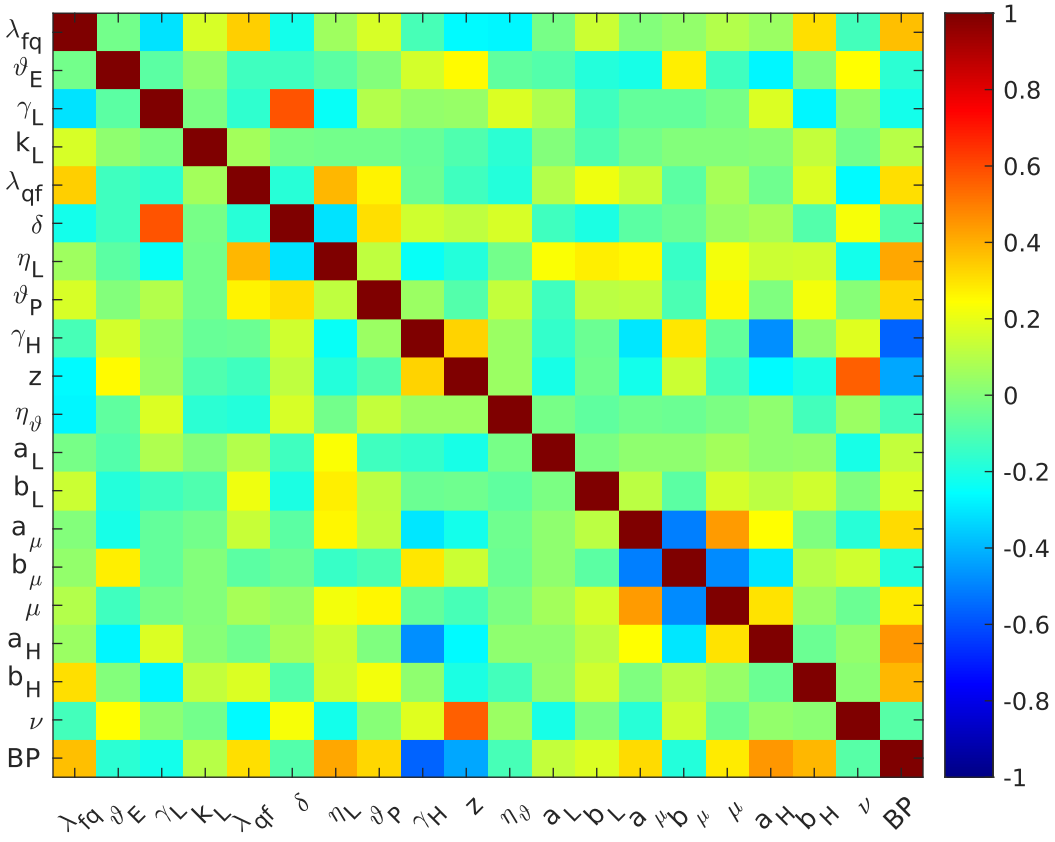
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

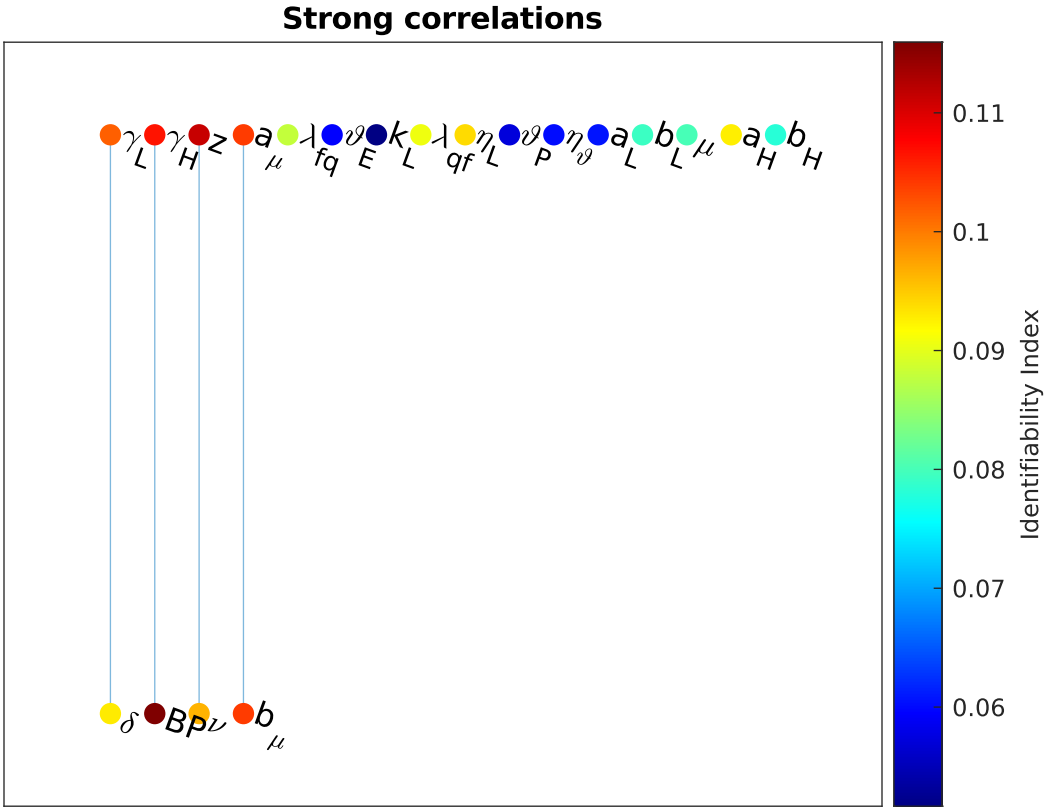
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0179'	'0.1016'	'0.0931'	'0.0578'	'0.0879'
\vartheta_E	'0'	'0.0003'	'0.0141'	'0.0001'	'0.0596'
\gamma_L	'0.227'	'0.9614'	'0.1667'	'0.9474'	'0.1018'
k_L	'1.45'	'9.2476'	'5.5048'	'5.7272'	'0.0517'
\lambda_{qf}	'0.4488'	'0.9113'	'0.4744'	'0.7168'	'0.0907'
\delta	'0.0033'	'0.0046'	'0.0122'	'0.0043'	'0.093'
\eta_L	'0.5195'	'0.9732'	'0.5104'	'0.7163'	'0.0939'
\vartheta_P	'0'	'0'	'0.0003'	'0'	'0.0573'
\gamma_H	'0.0567'	'0.4176'	'0.2912'	'0.2241'	'0.1065'
z	'0.9791'	'1.4478'	'15.9985'	'1.0491'	'0.1112'
\eta_\vartheta	'0.8018'	'0.9788'	'0.8484'	'0.8392'	'0.0603'
a_L	'6.0665'	'14.6427'	'1.9972'	'7.4123'	'0.0608'
b_L	'5.4264'	'15'	'11.309'	'14.1156'	'0.0793'
a_\mu	'1.6121'	'14.454'	'9.9077'	'5.7338'	'0.104'
b_\mu	'2.2236'	'15'	'5.2261'	'11.214'	'0.1041'
\mu	'0.0003'	'0.0042'	'0.055'	'0.0021'	'0.0802'
a_H	'6.4831'	'14.1301'	'6.525'	'13.2614'	'0.0927'
b_H	'2.1401'	'10.7666'	'4.5974'	'4.8874'	'0.0782'
\nu	'0.0556'	'0.5812'	'264.6272'	'0.268'	'0.0966'
BP	'335.1399'	'340.8809'	'345.5'	'335.5'	'0.1159'

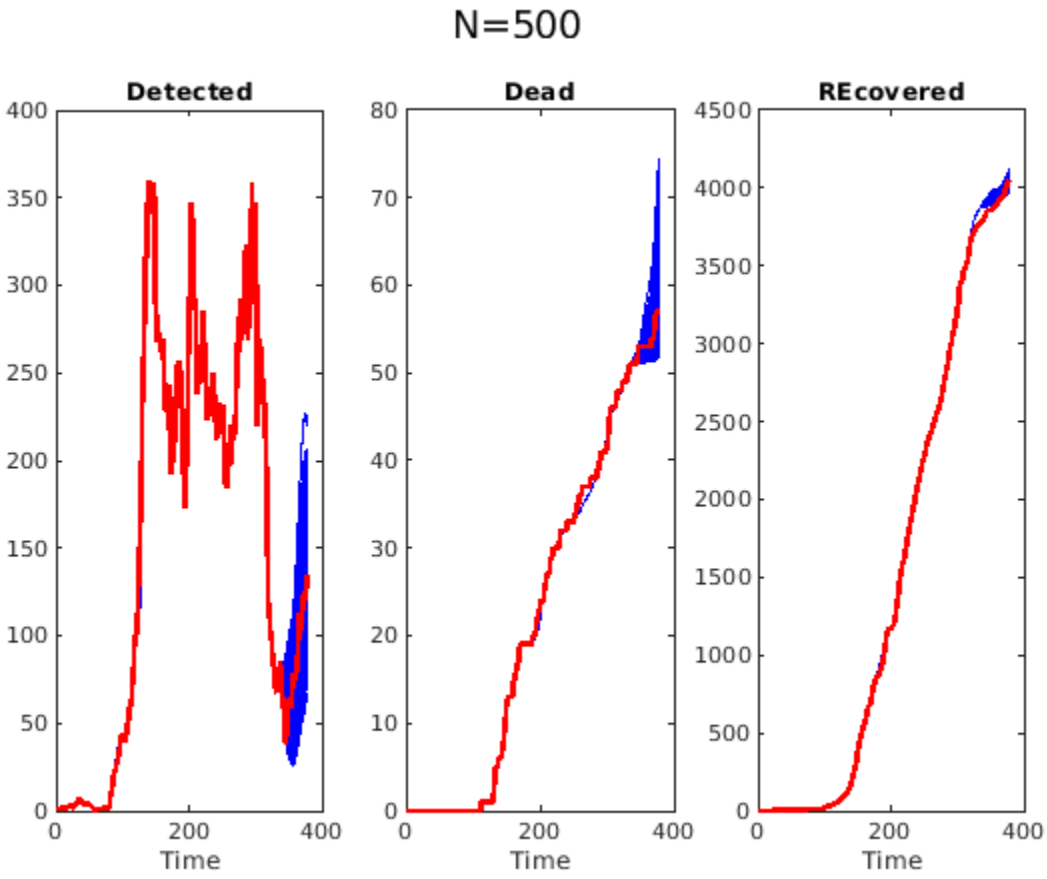
9.3. Identifiability analisys




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
0.11
0.1
0.09
0.08
0.07
0.06

9.4. Uncertainty analisys



Chapter 10. Extension number10

10.1. Basic information

The extension to be validated consists of the time series from the data379 to the 400. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

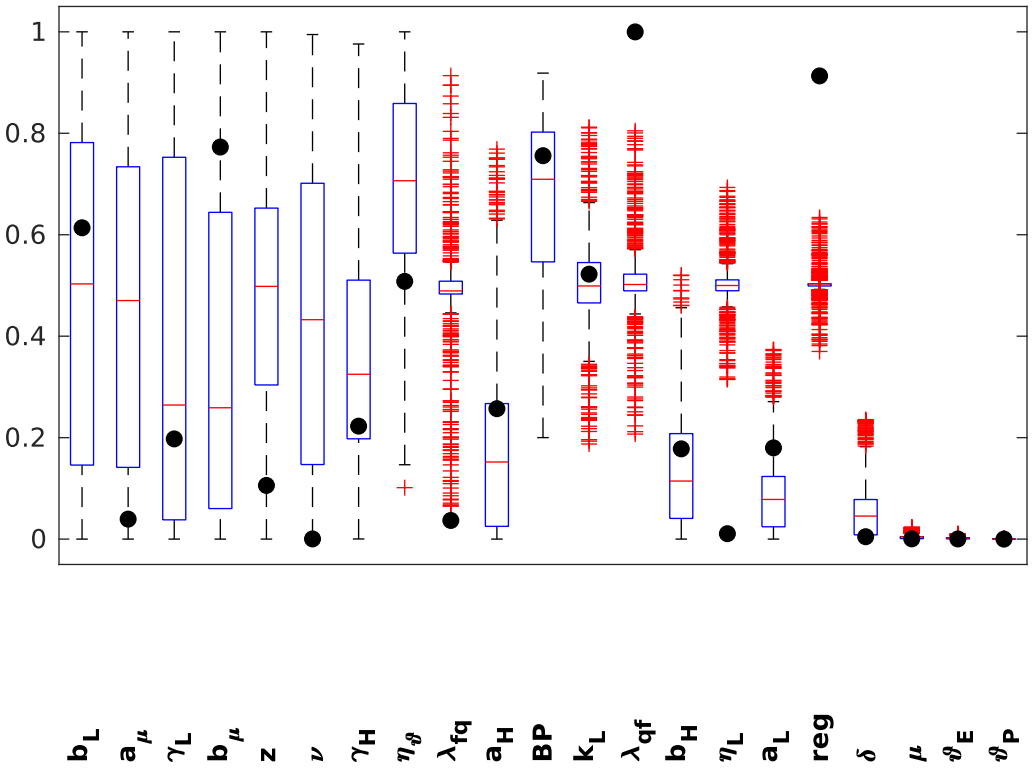
10.2. Estimated parameters with their intervals

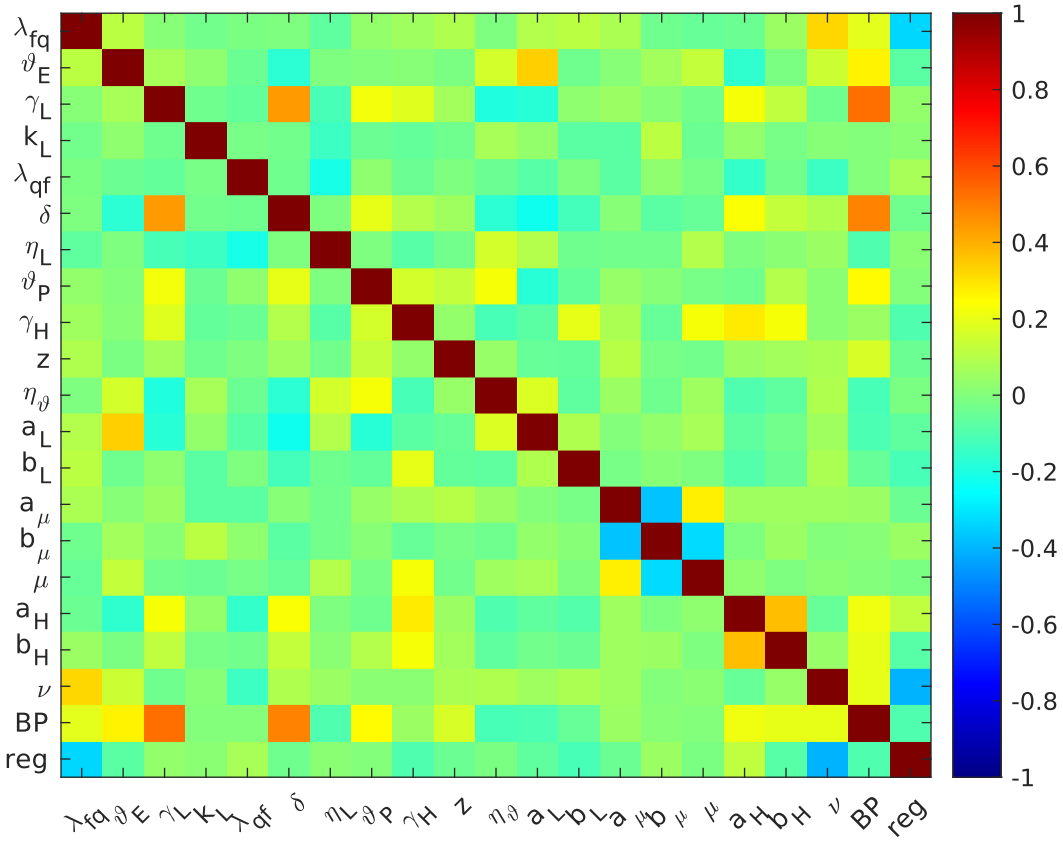
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

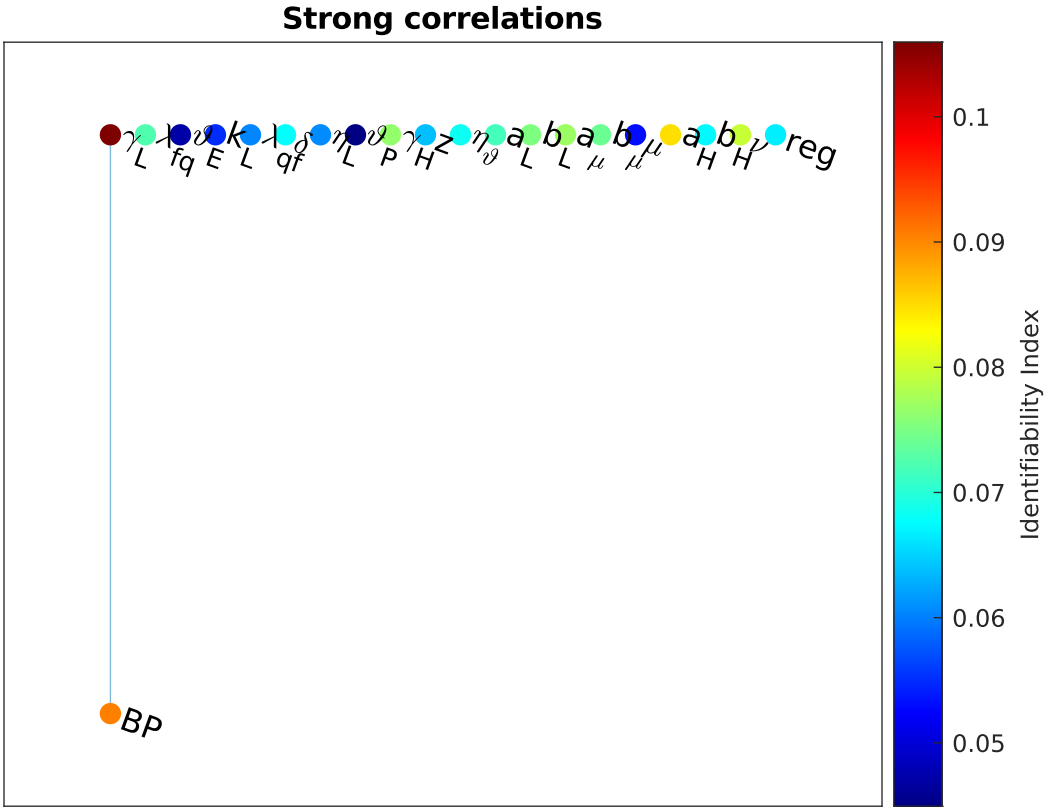
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0021'	'0.0827'	'0.4892'	'0.0368'	'0.0724'
\vartheta_E	'0.0001'	'0.0006'	'0.002'	'0.0003'	'0.0472'
\gamma_L	'0.1793'	'0.2617'	'0.2643'	'0.1975'	'0.106'
k_L	'1.225'	'10'	'5.4913'	'5.7007'	'0.055'
\lambda_{qf}	'0.1787'	'1'	'0.5019'	'0.9999'	'0.0605'
\delta	'0.0001'	'0.0013'	'0.0068'	'0.0007'	'0.0679'
\eta_L	'0'	'0.0217'	'0.4999'	'0.0107'	'0.0608'
\vartheta_P	'0'	'0'	'0.0001'	'0'	'0.0449'
\gamma_H	'0.0101'	'0.3861'	'0.3256'	'0.2227'	'0.0765'
z	'2.8357'	'13.8807'	'14.9463'	'3.1743'	'0.0639'
\eta_\vartheta	'0.4979'	'0.5327'	'0.7065'	'0.5081'	'0.0684'
a_L	'1.8835'	'4.9083'	'2.0946'	'3.5179'	'0.0716'
b_L	'7.0984'	'15'	'8.0429'	'9.5919'	'0.0753'
a_\mu	'1.2993'	'12.97'	'7.5831'	'1.5517'	'0.0769'
b_\mu	'1.9293'	'13.0165'	'4.6248'	'11.8203'	'0.0742'
\mu	'0'	'0.0009'	'0.0045'	'0.0005'	'0.0532'
a_H	'1.3325'	'14.3'	'3.1292'	'4.5988'	'0.085'
b_H	'1'	'15'	'2.6025'	'3.4908'	'0.0675'
\nu	'0'	'0.3979'	'216.2589'	'0.1768'	'0.0796'
BP	'379.3615'	'382.9203'	'377.5'	'379.5'	'0.0907'
reg	'0.0773'	'0.2322'	'0.1257'	'0.2283'	'0.0668'

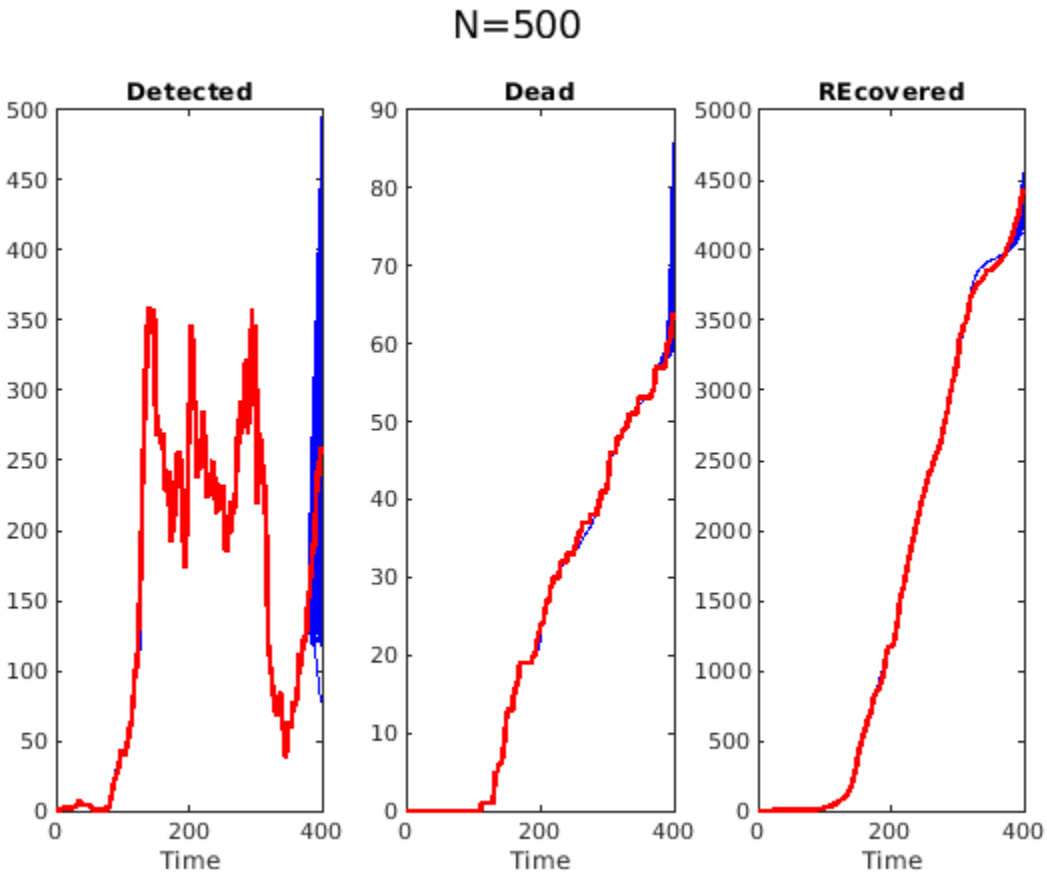
10.3. Identifiability analisys




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


Strong correlations
reg
Bp
Identifiability Index
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 data400 to the 450. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was6000.

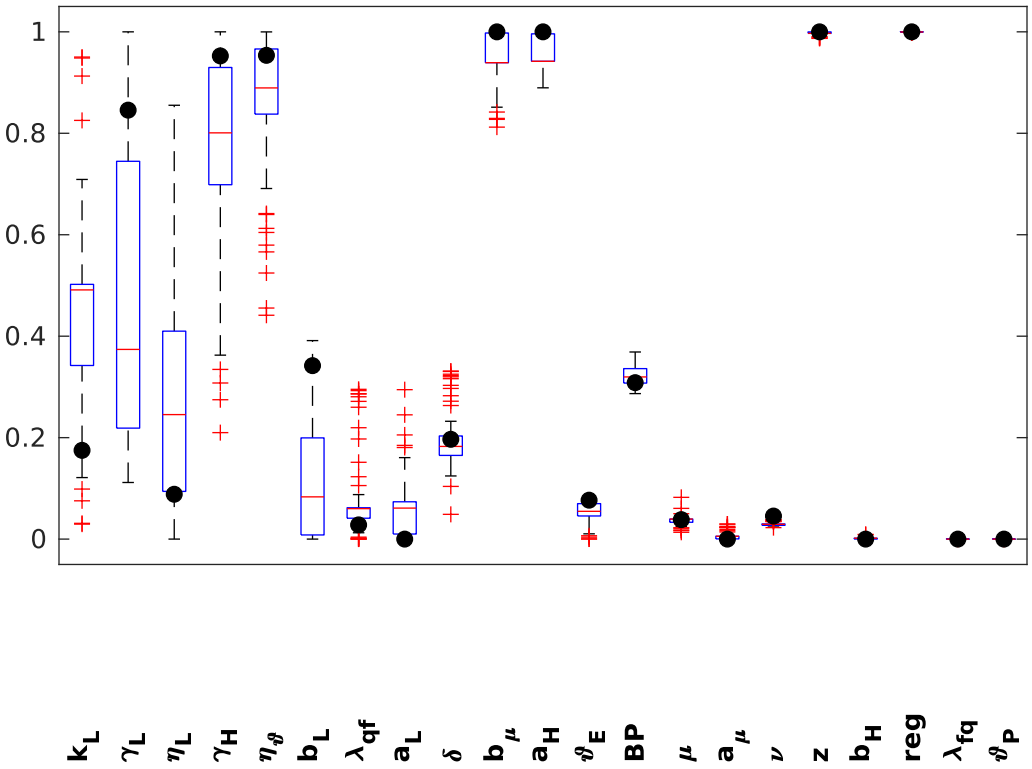
11.2. Estimated parameters with their intervals

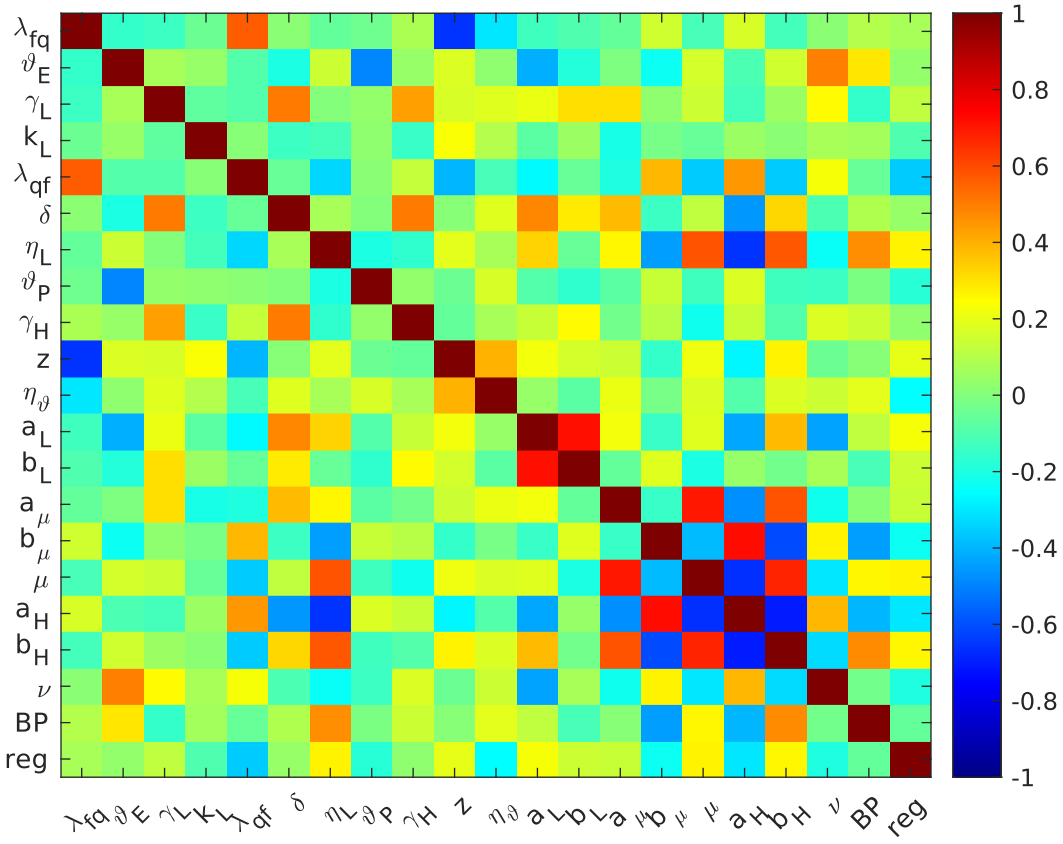
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

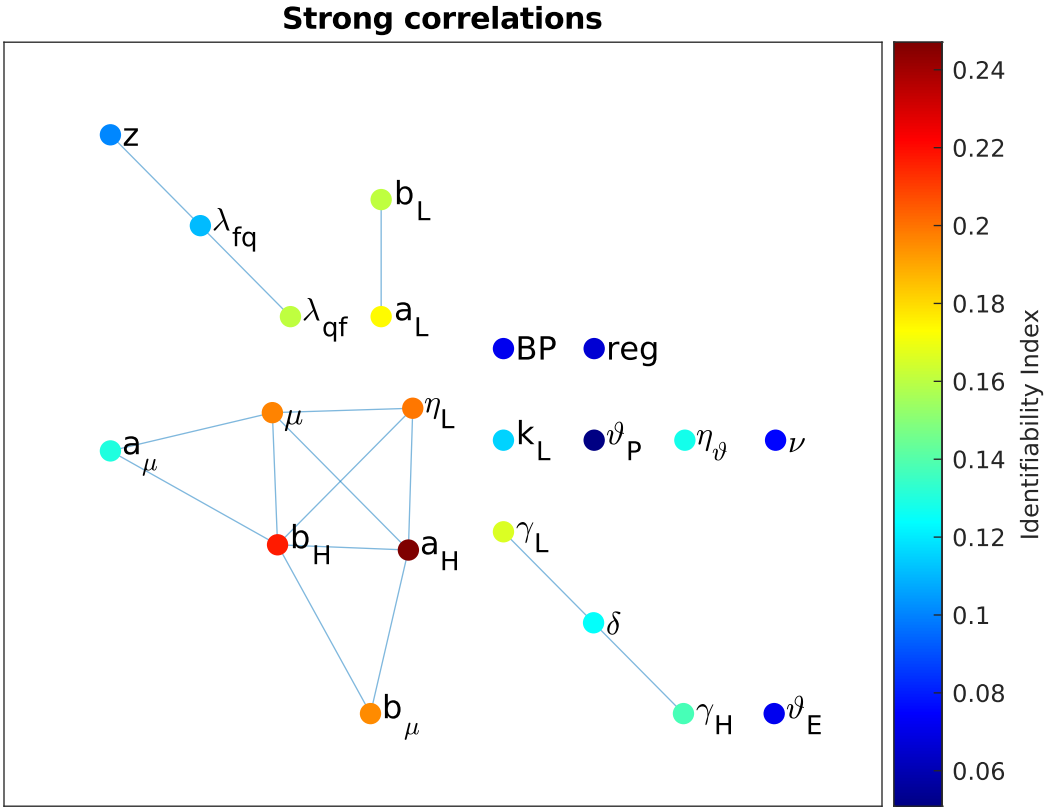
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0'	'0'	'0'	'0'	'0.111'
\vartheta_E	'0.0758'	'0.1073'	'0.0548'	'0.0767'	'0.0723'
\gamma_L	'0.5268'	'0.9311'	'0.3739'	'0.8456'	'0.1666'
k_L	'1.2031'	'8.7265'	'5.4211'	'2.5747'	'0.1159'
\lambda_{qf}	'0.0031'	'0.063'	'0.06'	'0.028'	'0.1605'
\delta	'0.0253'	'0.0326'	'0.0274'	'0.0295'	'0.1251'
\eta_L	'0.0708'	'0.1989'	'0.2454'	'0.0884'	'0.1989'
\vartheta_P	'0'	'0'	'0'	'0'	'0.0509'
\gamma_H	'0.3245'	'0.9654'	'0.8008'	'0.9525'	'0.138'
z	'17.9691'	'30'	'29.9094'	'29.9992'	'0.1014'
\eta_\vartheta	'0.3116'	'1'	'0.8894'	'0.9537'	'0.1281'
a_L	'1'	'1.15'	'1.8556'	'1'	'0.1736'
b_L	'4.6597'	'5.7943'	'2.1657'	'5.7871'	'0.1611'
a_\mu	'1'	'12.34'	'1.0786'	'1.0001'	'0.13'
b_\mu	'5.0783'	'15'	'14.1486'	'14.9992'	'0.1953'
\mu	'0.0308'	'0.0384'	'0.0395'	'0.0384'	'0.1971'
a_H	'8.8086'	'15'	'14.1865'	'14.9998'	'0.2471'
b_H	'1'	'6.0731'	'1.0244'	'1'	'0.2168'
\nu	'17.7311'	'22.7561'	'14.5957'	'22.7095'	'0.0754'
BP	'397.4831'	'400.7354'	'398.5'	'397.811'	'0.0717'
reg	'0.2209'	'0.25'	'0.2499'	'0.25'	'0.0666'

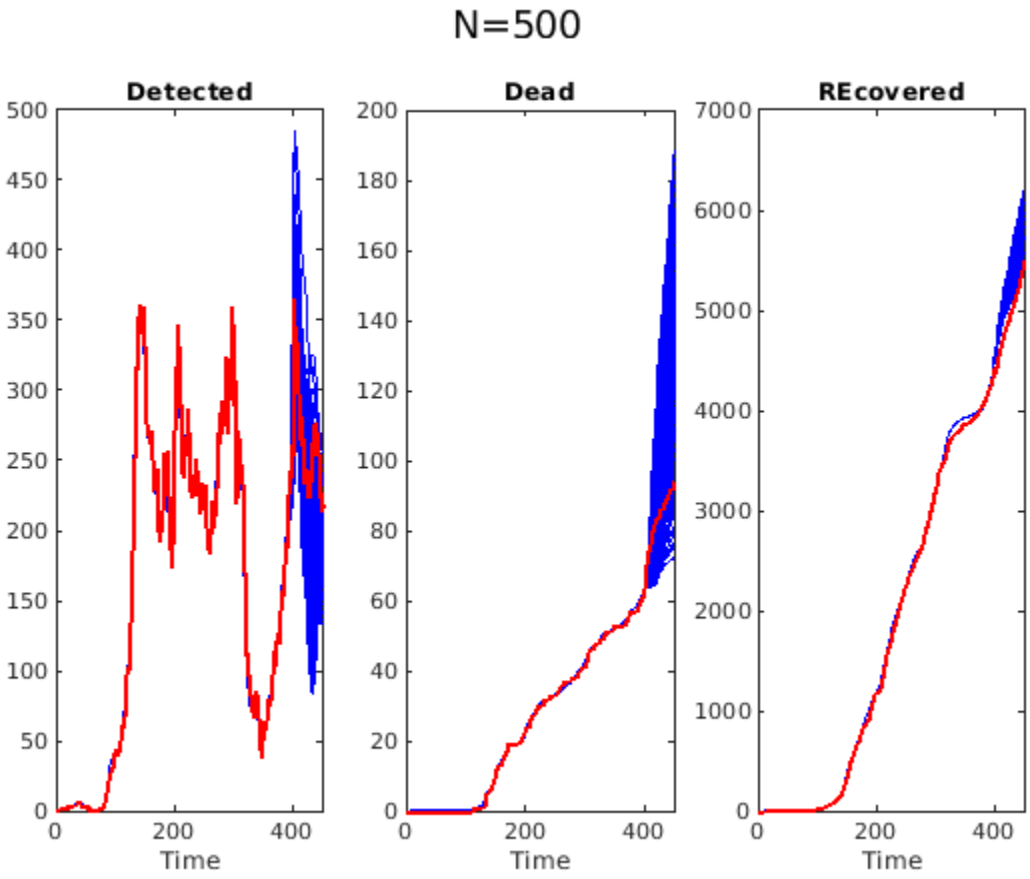
11.3. Identifiability analisys




λfq
ϑE
γL
kL
λqf
δ
ηL
ϑP
γH
z
ηϑ
aL
bL
aμ
bμ
μ
aH
bH
ν
BP
reg
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}
b_L
a_L
BP
reg
k_L
ϑ_P
η_ϑ
ν
μ
η_L
a_μ
b_H
a_H
γ_L
δ
b_μ
γ_H
ϑ_E
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
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 data450 to the 451. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

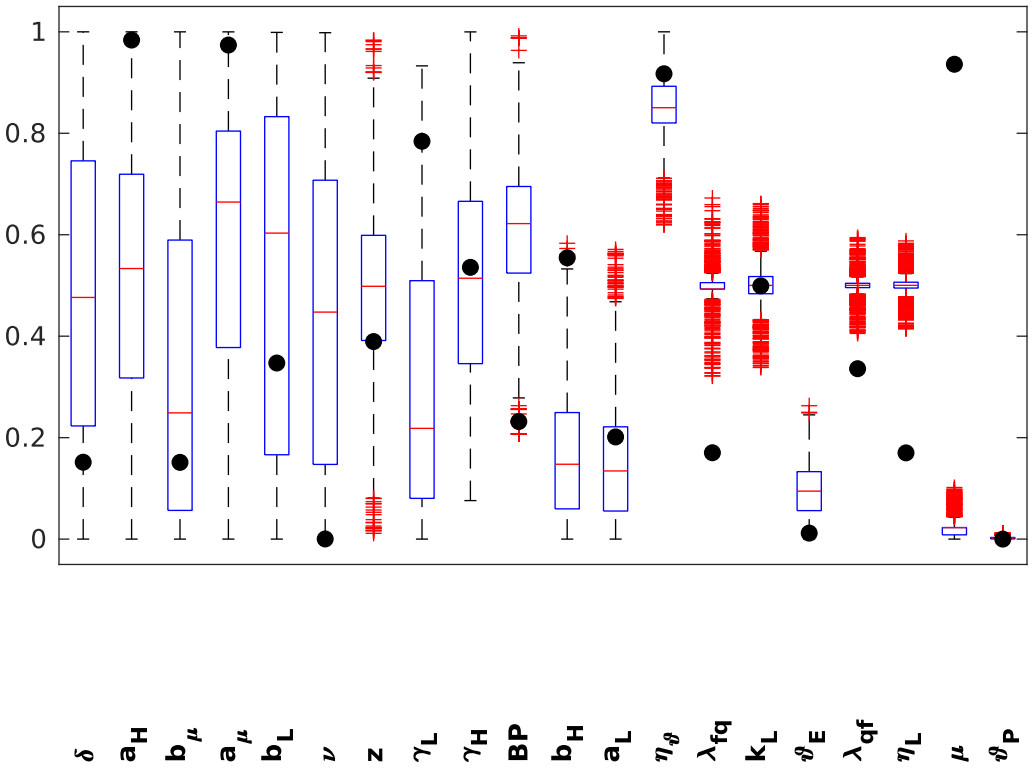
12.2. Estimated parameters with their intervals

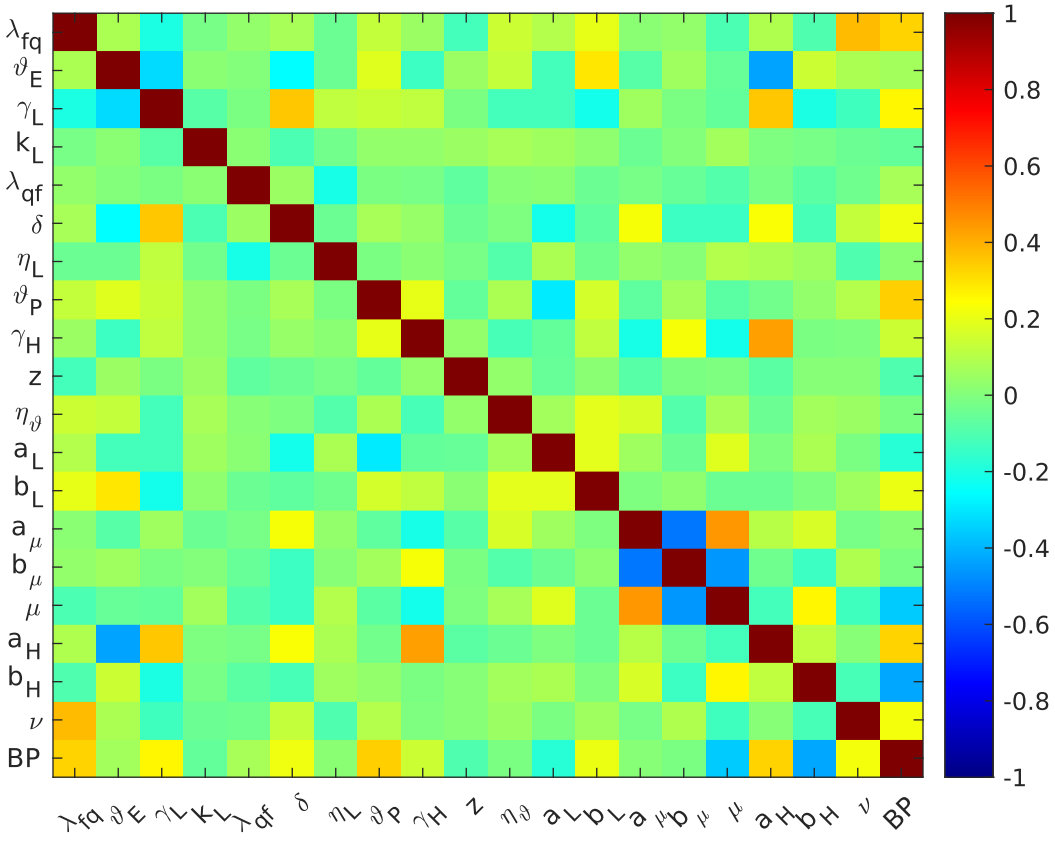
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

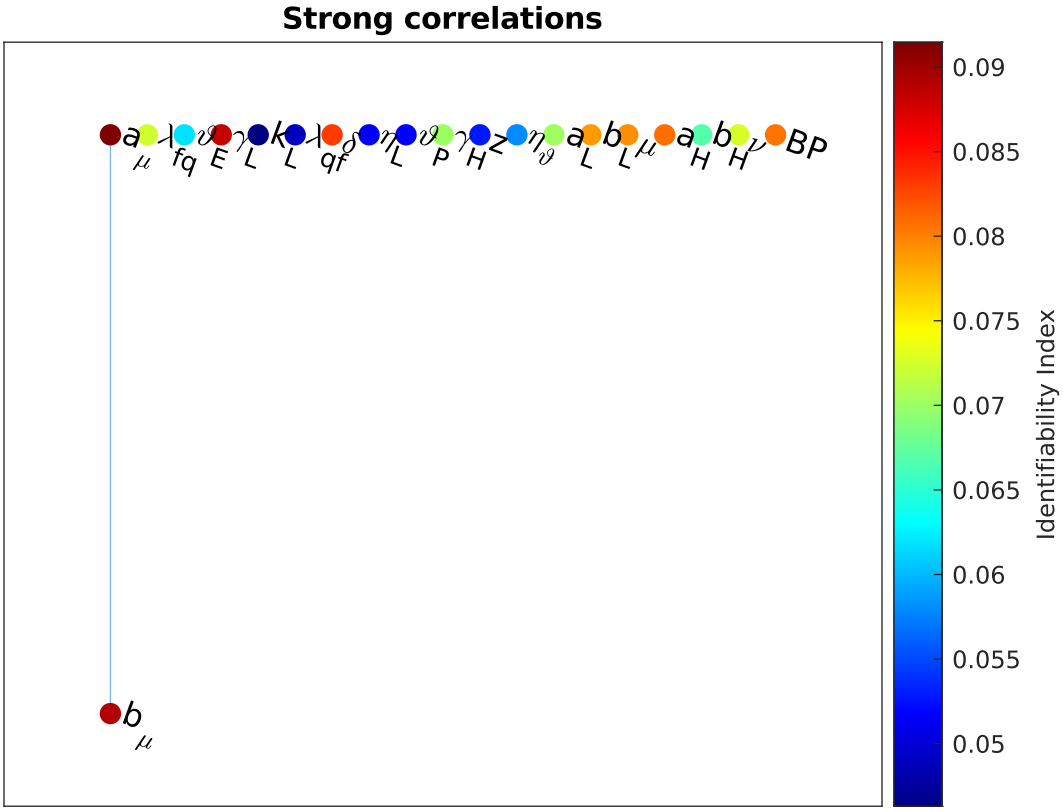
Due to a deviation from the median the CSB method was activated to obtain the parameter intervals.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0818'	'0.2953'	'0.4928'	'0.1702'	'0.0724'
\vartheta_E	'0.0034'	'0.0164'	'0.0946'	'0.0118'	'0.062'
\gamma_L	'0.2591'	'0.9692'	'0.2184'	'0.7842'	'0.0882'
k_L	'1.18'	'10'	'5.5013'	'5.4931'	'0.0463'
\lambda_{qf}	'0.3305'	'0.6305'	'0.5002'	'0.3359'	'0.0491'
\delta	'0.0197'	'0.0292'	'0.0715'	'0.0227'	'0.083'
\eta_L	'0.007'	'0.2425'	'0.5003'	'0.17'	'0.0515'
\vartheta_P	'0'	'0'	'0.0023'	'0'	'0.0518'
\gamma_H	'0.3249'	'1'	'0.5143'	'0.5357'	'0.0701'
z	'10.4024'	'18.574'	'14.952'	'11.6822'	'0.0529'
\eta_\vartheta	'0.6895'	'0.9614'	'0.8504'	'0.9173'	'0.0581'
a_L	'2.5198'	'9.0437'	'2.8831'	'3.8194'	'0.0702'
b_L	'5.2211'	'15'	'9.445'	'5.8596'	'0.0789'
a_\mu	'12.2599'	'14.7991'	'10.3021'	'14.6352'	'0.0915'
b_\mu	'1.1417'	'3.6832'	'4.4841'	'3.1179'	'0.0891'
\mu	'0.1'	'1'	'0.0227'	'0.9361'	'0.0794'
a_H	'10.3028'	'15'	'8.4673'	'14.7727'	'0.0808'
b_H	'7.3643'	'13.0859'	'3.0692'	'8.7626'	'0.0668'
\nu	'0.0292'	'0.281'	'223.7529'	'0.1434'	'0.0726'
BP	'409.2971'	'413.3399'	'425.5'	'409.5009'	'0.0806'

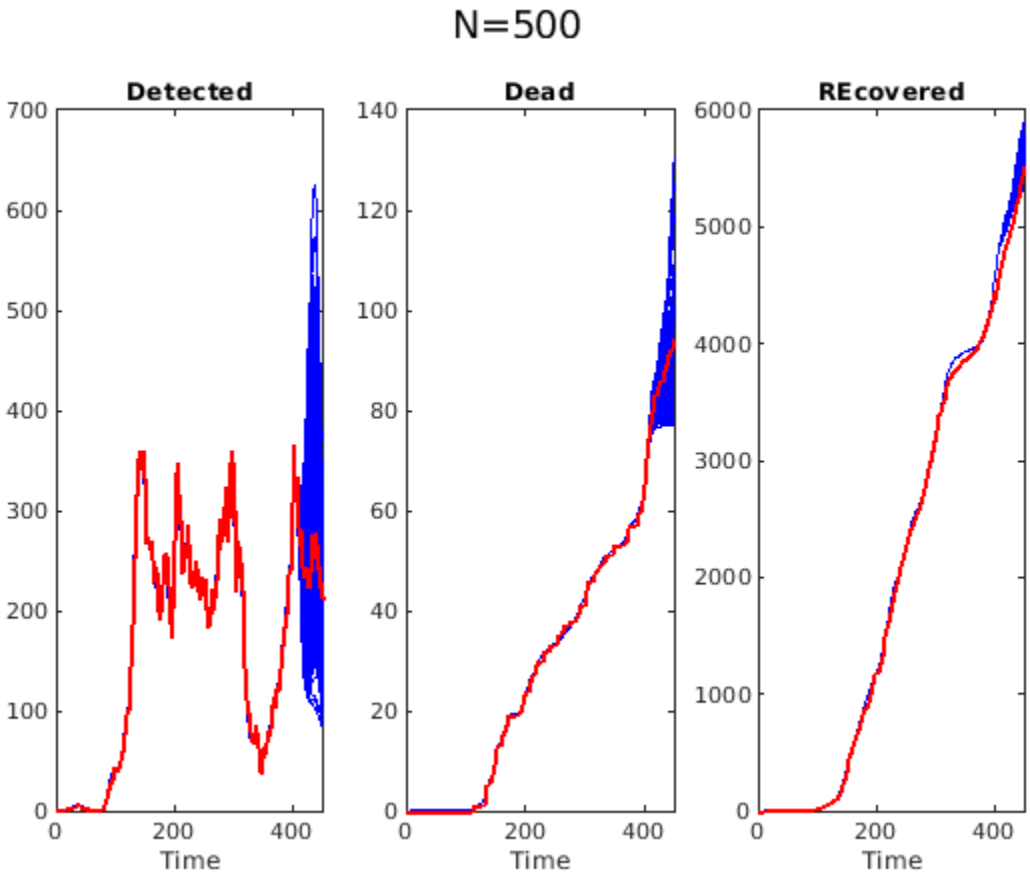
12.3. Identifiability analisys




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
0.09
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 data451 to the 472. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

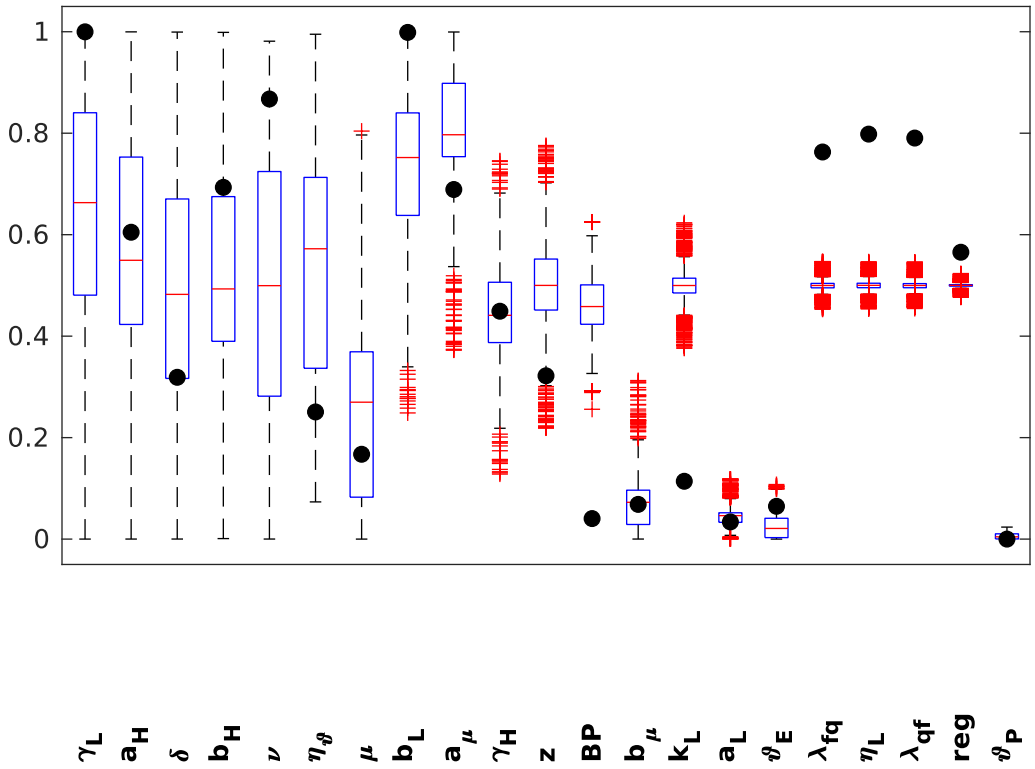
13.2. Estimated parameters with their intervals

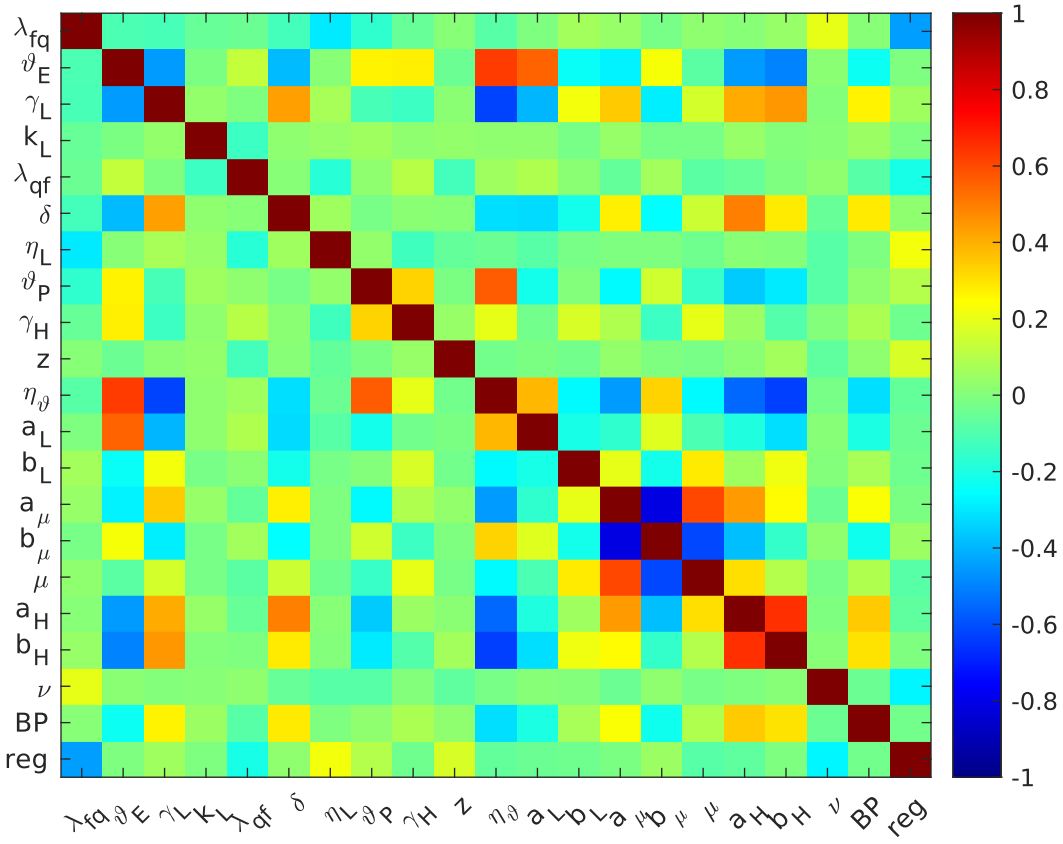
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0225'	'0.9'	'0.4999'	'0.763'	'0.0536'
\vartheta_E	'0'	'0.1178'	'0.021'	'0.0646'	'0.1086'
\gamma_L	'0.7611'	'1'	'0.6632'	'0.9998'	'0.1101'
k_L	'1.4444'	'10'	'5.4984'	'2.0257'	'0.0394'
\lambda_{qf}	'0.0387'	'0.9216'	'0.4999'	'0.7904'	'0.0478'
\delta	'0.022'	'0.094'	'0.0724'	'0.0478'	'0.0897'
\eta_L	'0'	'1'	'0.5002'	'0.7982'	'0.0455'
\vartheta_P	'0'	'0'	'0.0045'	'0'	'0.0746'
\gamma_H	'0.2992'	'1'	'0.4411'	'0.4491'	'0.0621'
z	'0'	'21.7283'	'15.0006'	'9.657'	'0.0447'
\eta_\vartheta	'0.2201'	'0.2746'	'0.5722'	'0.2506'	'0.1698'
a_L	'1.436'	'1.6676'	'1.6474'	'1.4743'	'0.0883'
b_L	'13.3237'	'15'	'11.5285'	'14.9815'	'0.0713'
a_\mu	'7.9857'	'15'	'12.1575'	'10.6465'	'0.121'
b_\mu	'1'	'6.4495'	'2.0155'	'1.9577'	'0.1149'
\mu	'0.0055'	'0.22'	'0.2698'	'0.1672'	'0.1045'
a_H	'5.0472'	'12.4692'	'8.6934'	'9.4674'	'0.125'
b_H	'5.3109'	'14.4964'	'7.9032'	'10.7061'	'0.1169'
\nu	'13.6966'	'500'	'249.7666'	'433.7135'	'0.0571'
BP	'450.2262'	'453.5693'	'455.5'	'450.4854'	'0.0653'
reg	'0'	'0.25'	'0.125'	'0.1413'	'0.0531'

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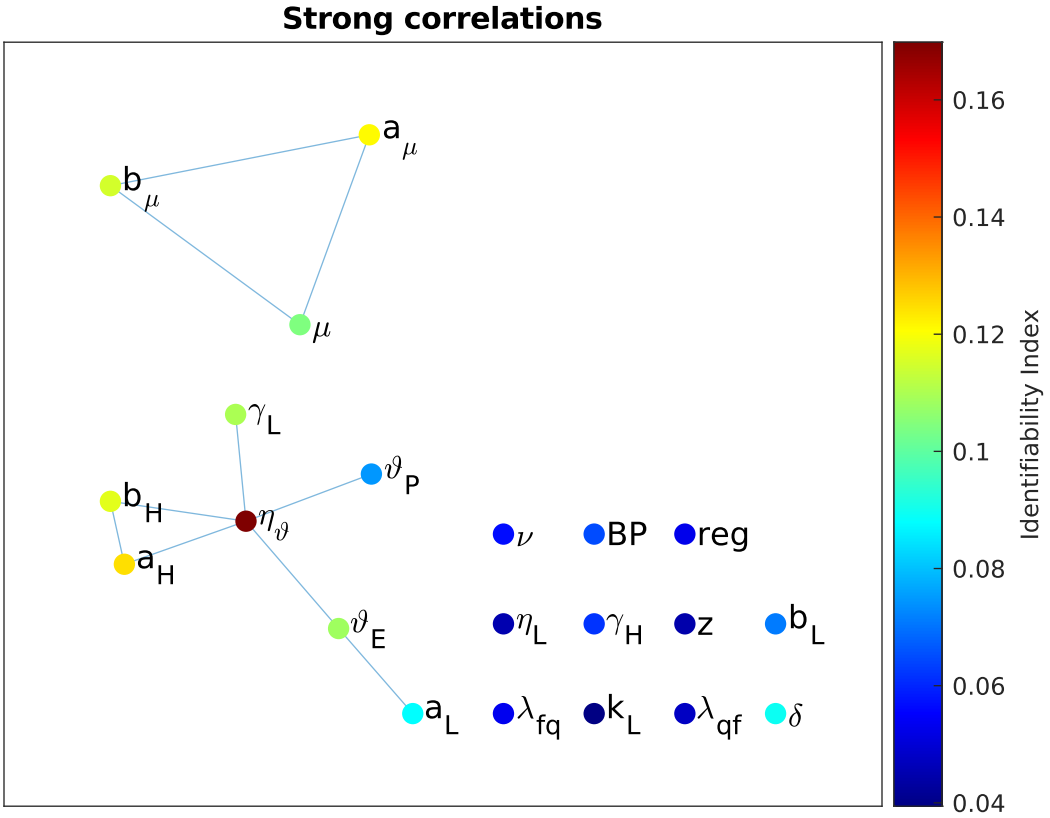
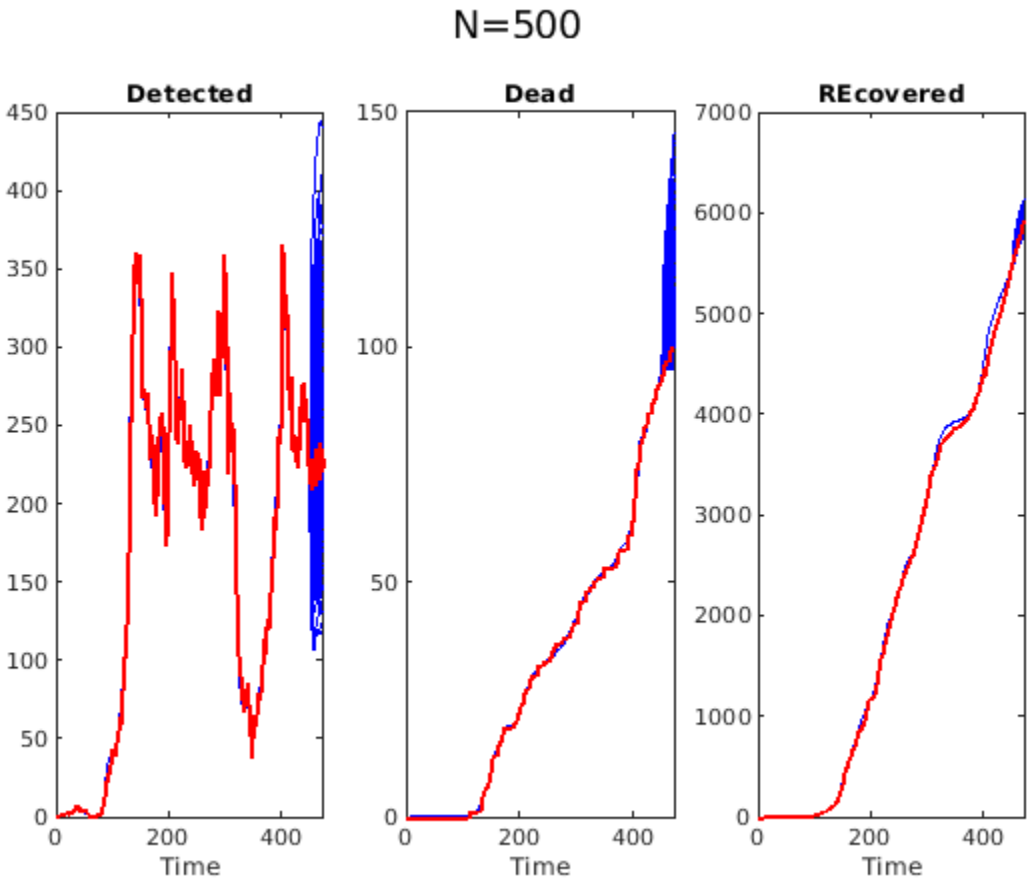
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
a μ
b μ
μ
γ L
ϑ P
b H
η ϑ
a H
ϑ E
a L
ν
BP
reg
η L
γ H
z
b L
λ fq
k L
λ qf
δ
0.16
0.14
0.12
0.1
0.08
0.06
0.04
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 data472 to the 508. The status of the validation is: COMPLETED.

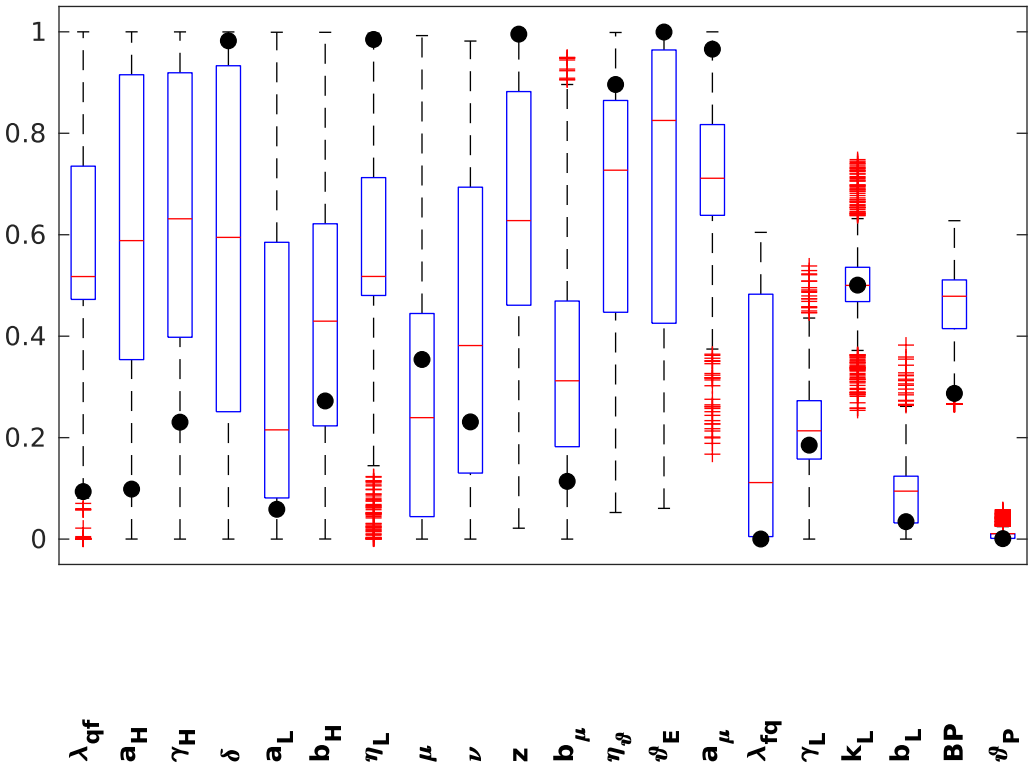
The number of estimations needed to perform the validation was1000.

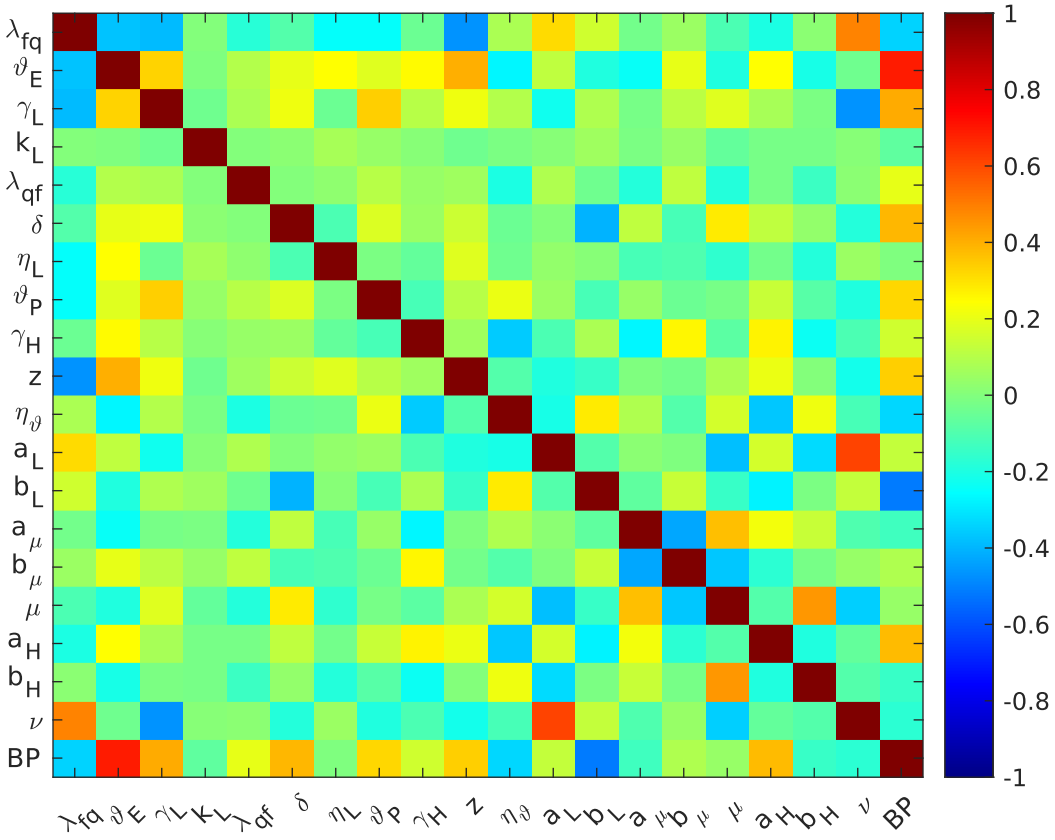
14.2. Estimated parameters with their intervals

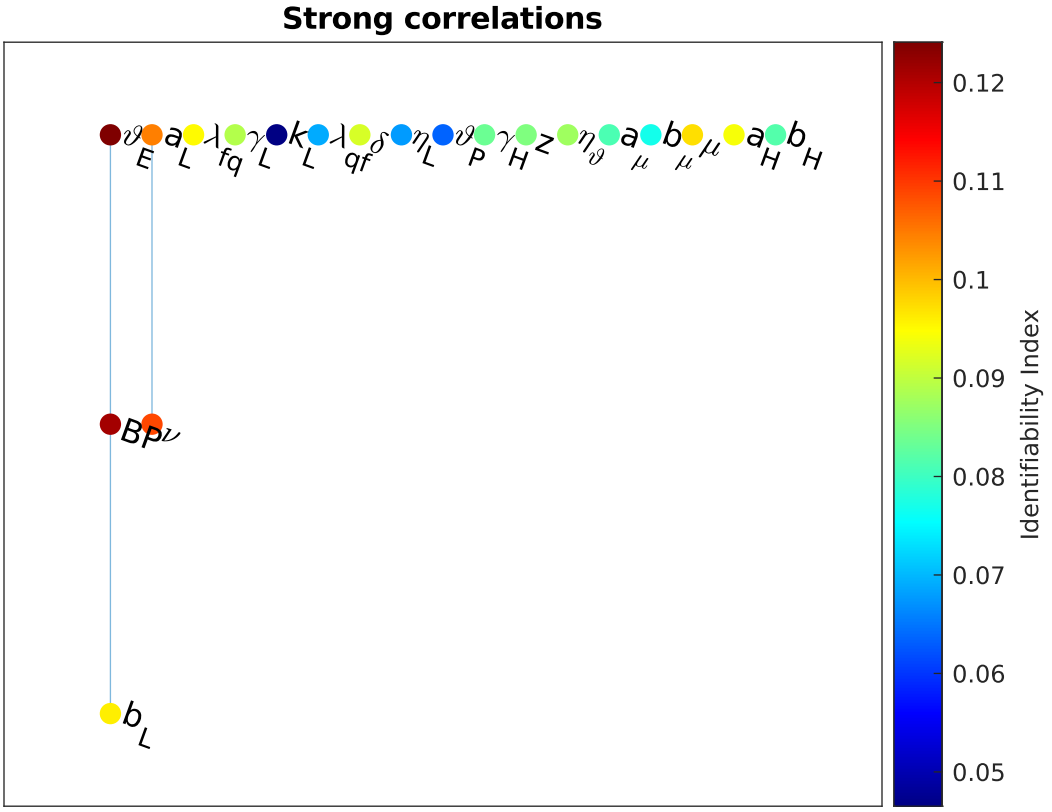
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0889'	'0.134'	'0.1114'	'0.0002'	'0.0953'
\vartheta_E	'0.7946'	'0.8559'	'0.8253'	'0.9996'	'0.1241'
\gamma_L	'0.1923'	'0.2347'	'0.2135'	'0.1852'	'0.0892'
k_L	'5.3677'	'5.6348'	'5.5012'	'5.5061'	'0.0465'
\lambda_{qf}	'0.4956'	'0.5396'	'0.5176'	'0.0936'	'0.0691'
\delta	'0.0842'	'0.0942'	'0.0892'	'0.1474'	'0.0919'
\eta_L	'0.4963'	'0.5392'	'0.5178'	'0.9849'	'0.0678'
\vartheta_P	'0.004'	'0.0174'	'0.0107'	'0.0009'	'0.0636'
\gamma_H	'0.6055'	'0.6573'	'0.6314'	'0.2305'	'0.0838'
z	'18.1462'	'19.5251'	'18.8356'	'29.8635'	'0.0853'
\eta_\vartheta	'0.7053'	'0.7492'	'0.7272'	'0.8962'	'0.0876'
a_L	'3.6169'	'4.4125'	'4.0147'	'1.8228'	'0.1045'
b_L	'2.0156'	'2.6314'	'2.3235'	'1.4811'	'0.0961'
a_\mu	'10.6256'	'11.292'	'10.9588'	'14.5213'	'0.0811'
b_\mu	'5.0644'	'5.6738'	'5.3691'	'2.5939'	'0.0769'
\mu	'0.2132'	'0.2656'	'0.2394'	'0.3541'	'0.0974'
a_H	'8.8334'	'9.6416'	'9.2375'	'2.3799'	'0.0943'
b_H	'6.6579'	'7.3713'	'7.0146'	'4.8124'	'0.0819'
\nu	'176.4812'	'205.0747'	'190.778'	'115.5195'	'0.1089'
BP	'472.9918'	'474.0082'	'473.5'	'464.5'	'0.1213'

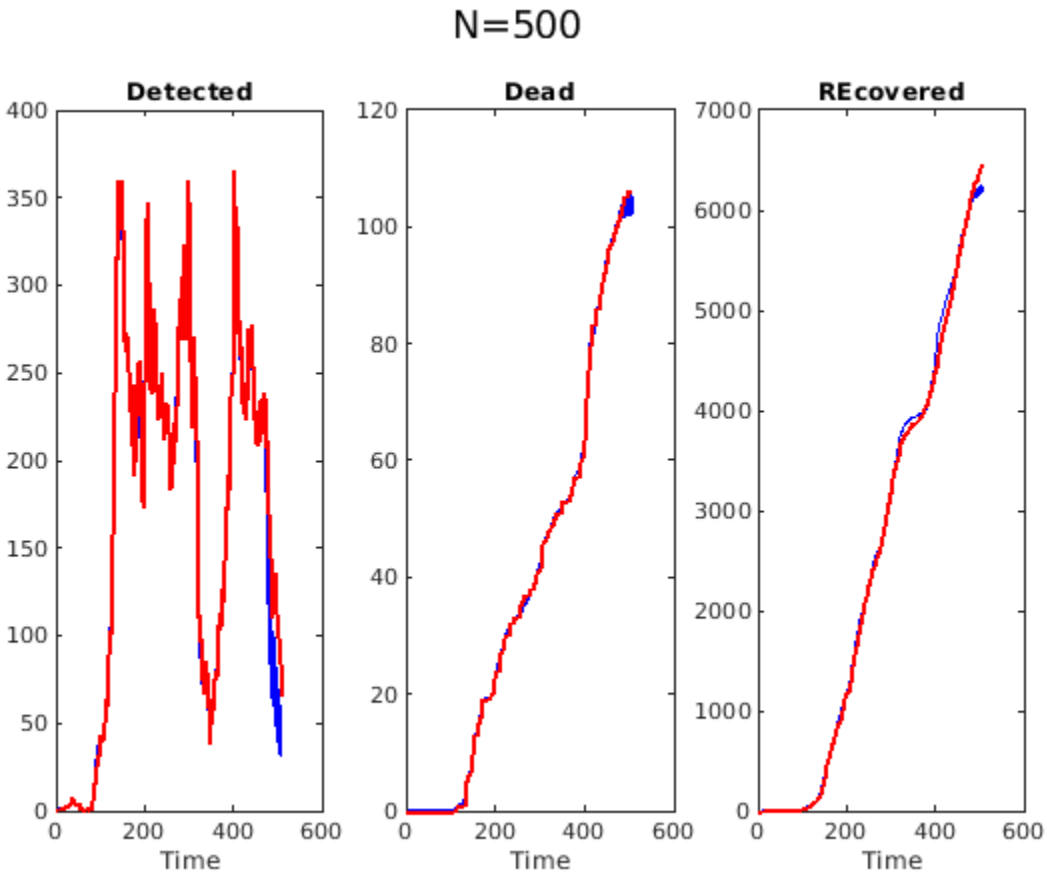
14.3. Identifiability analisys




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
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05

14.4. Uncertainty analisys



Chapter 15. Extension number15

15.1. Basic information

The extension to be validated consists of the time series from the data508 to the 714. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was4000.

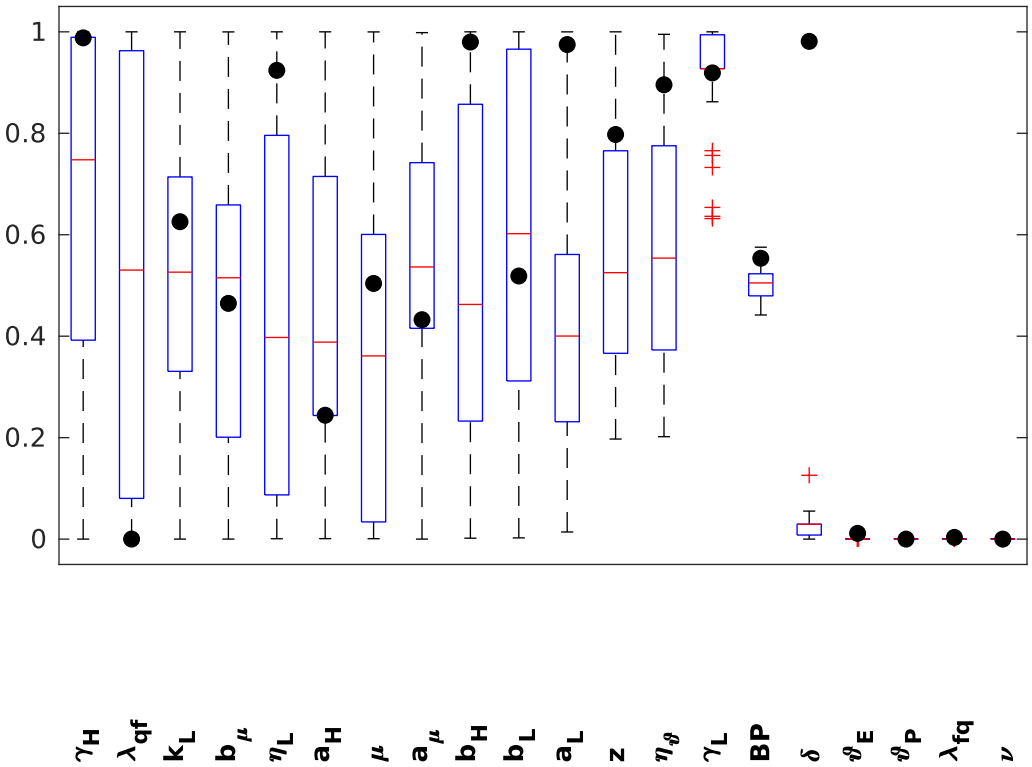
15.2. Estimated parameters with their intervals

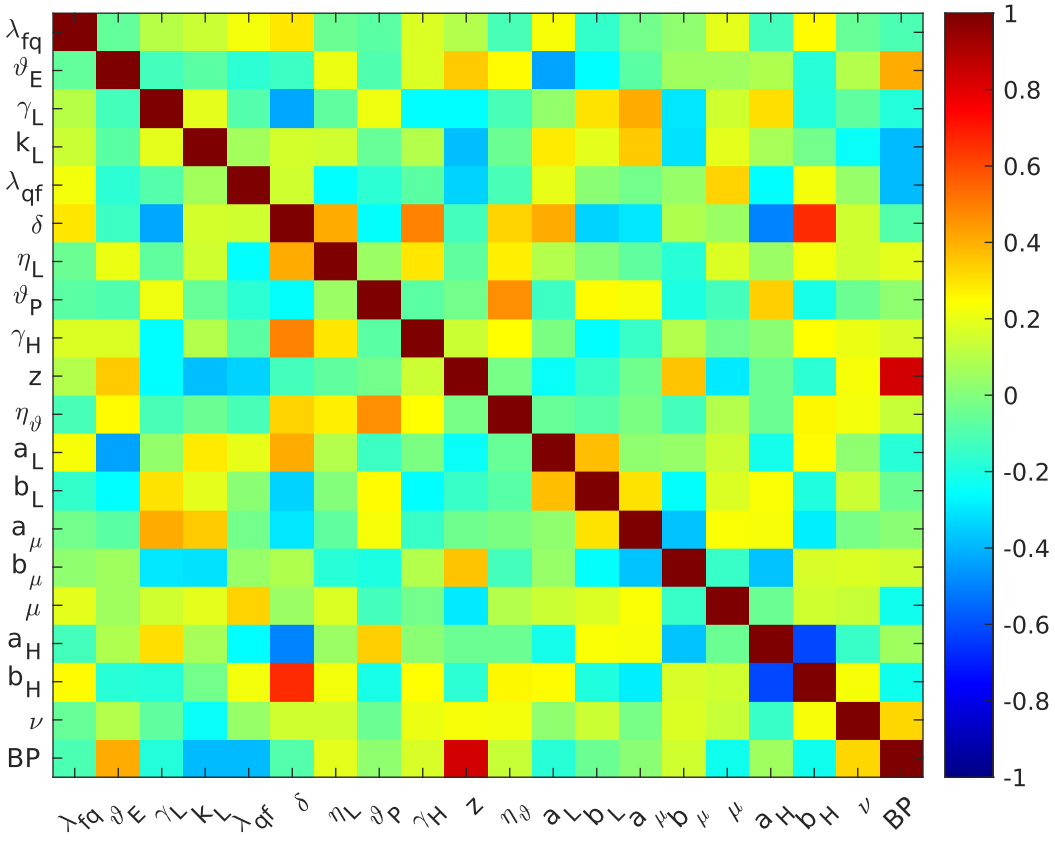
It was necessary to fix 0 parameters of 10 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.0032'	'0.0049'	'0'	'0.0034'	'0.0772'
\vartheta_E	'0.0056'	'0.014'	'0.0001'	'0.0113'	'0.0707'
\gamma_L	'0.6209'	'0.9562'	'0.9274'	'0.919'	'0.1539'
k_L	'4.5643'	'6.87'	'5.7361'	'6.6312'	'0.15'
\lambda_{qf}	'0'	'0.0001'	'0.5303'	'0.0001'	'0.1828'
\delta	'0.1326'	'0.1473'	'0.0044'	'0.1472'	'0.1786'
\eta_L	'0.6718'	'0.9401'	'0.3975'	'0.9241'	'0.1676'
\vartheta_P	'0'	'0'	'0.0001'	'0'	'0.0636'
\gamma_H	'0.806'	'0.9903'	'0.7478'	'0.9881'	'0.1674'
z	'22.6417'	'24.1255'	'15.7558'	'23.9281'	'0.1624'
\eta_\vartheta	'0.7639'	'0.9121'	'0.5539'	'0.8956'	'0.133'
a_L	'12.5695'	'14.8817'	'6.6038'	'14.6489'	'0.1382'
b_L	'4.6757'	'8.477'	'9.4282'	'8.2611'	'0.1742'
a_\mu	'6.8211'	'9.3633'	'8.5105'	'7.0551'	'0.1394'
b_\mu	'5.128'	'10.9926'	'8.2121'	'7.5056'	'0.151'
\mu	'0.2378'	'0.5097'	'0.3611'	'0.504'	'0.1622'
a_H	'3.3406'	'4.4528'	'6.4367'	'4.4183'	'0.1697'
b_H	'12.602'	'14.7205'	'7.4763'	'14.718'	'0.206'
\nu	'0.0004'	'0.0008'	'0.0005'	'0.0006'	'0.0587'
BP	'597.5'	'704'	'589.1652'	'600.4432'	'0.0985'

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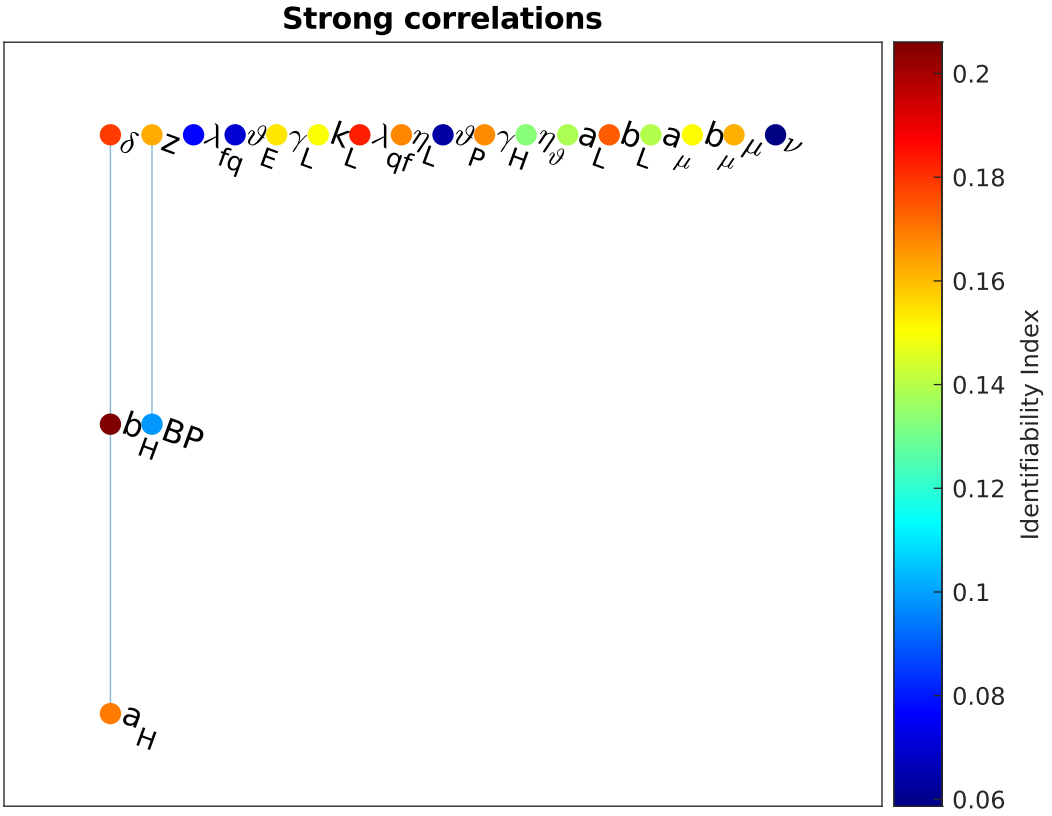
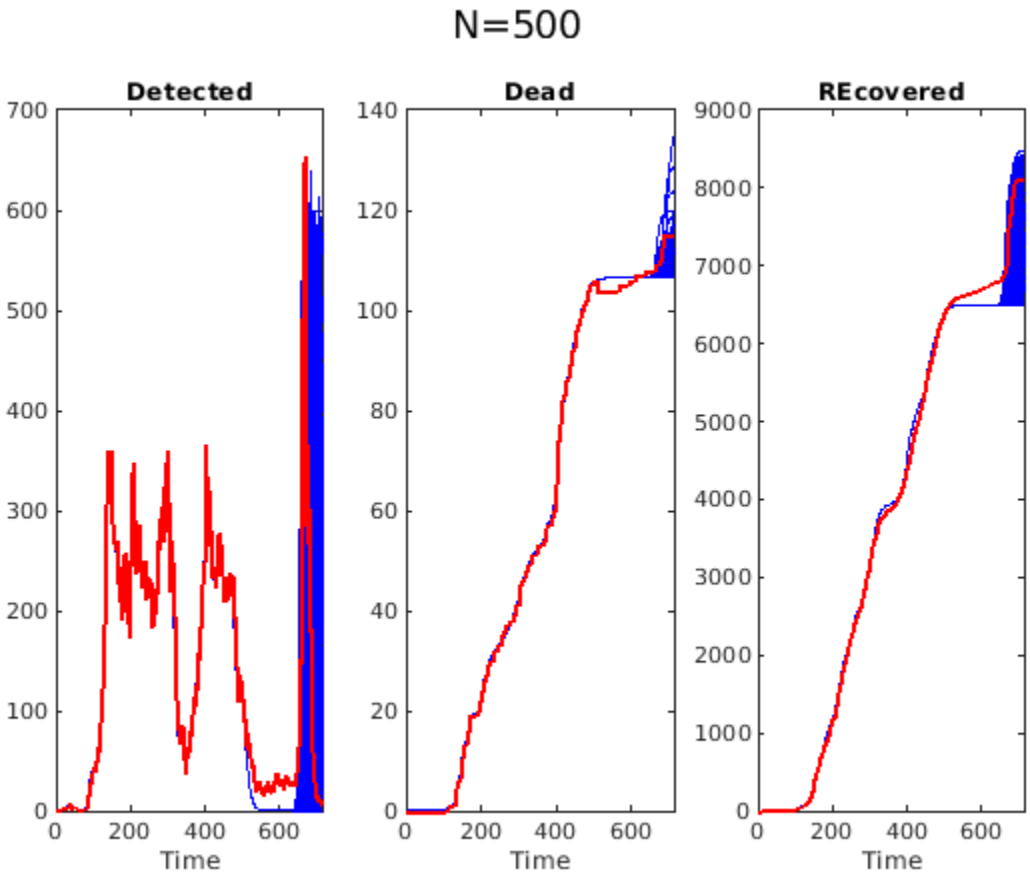
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Strong correlations
Identifiability Index
0.2
0.18
0.16
0.14
0.12
0.1
0.08
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 data714 to the 728. The status of the validation is: COMPLETED.

The number of estimations needed to perform the validation was1000.

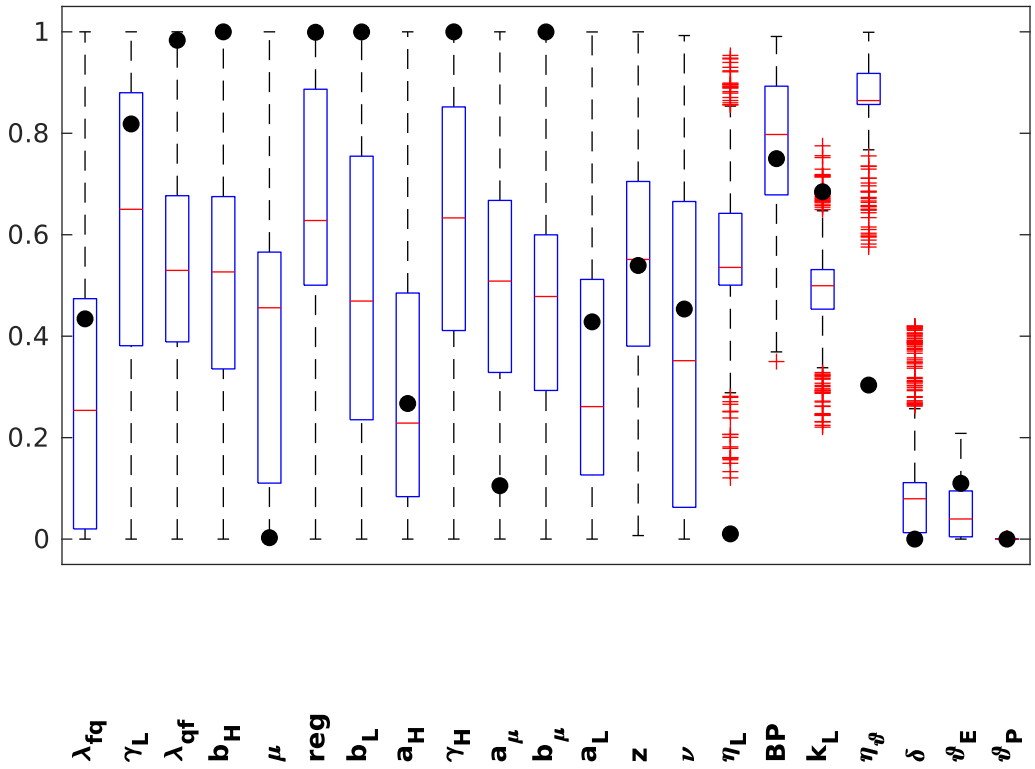
16.2. Estimated parameters with their intervals

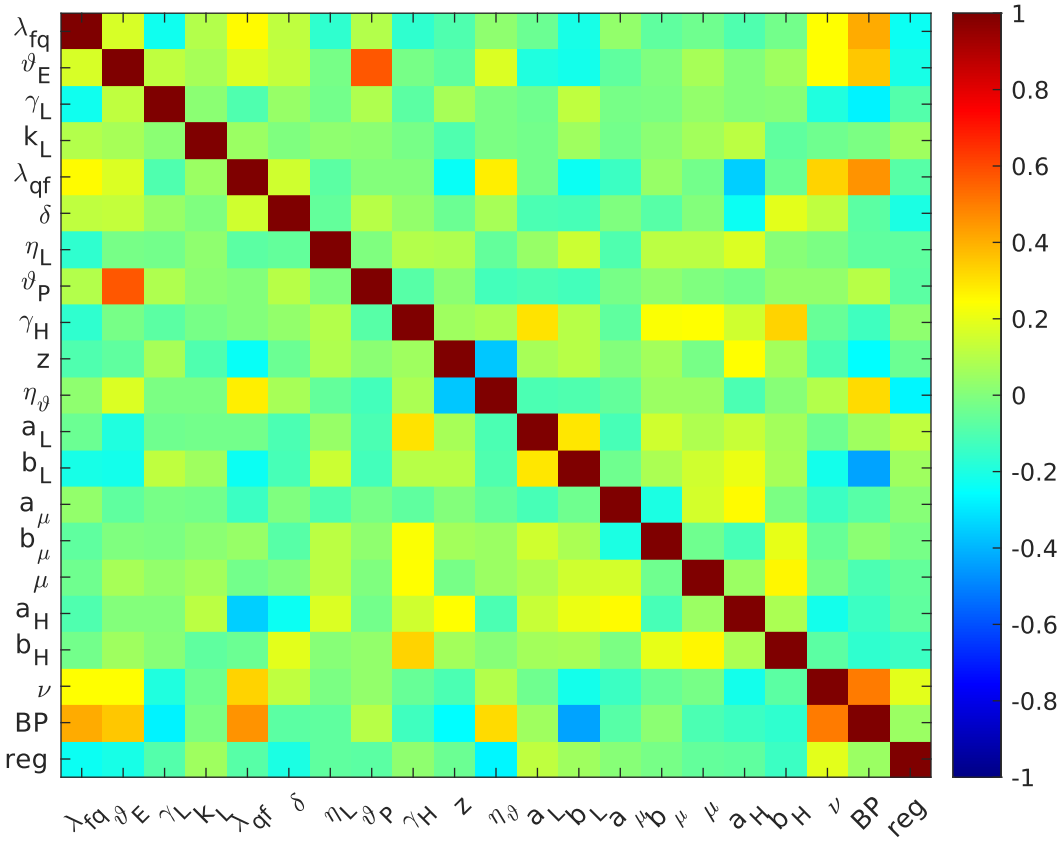
It was necessary to fix 0 parameters of 11 that could be fixed to complete validation.

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

	Rango		Nominal	Mejor	Index
\lambda_{fq}	'0.3924'	'0.57'	'0.2538'	'0.4342'	'0.0866'
\vartheta_E	'0.0841'	'0.1227'	'0.0398'	'0.11'	'0.0824'
\gamma_L	'0.5427'	'0.9771'	'0.6502'	'0.8184'	'0.0775'
k_L	'1'	'10'	'5.4953'	'7.1621'	'0.056'
\lambda_{qf}	'0.9789'	'0.9947'	'0.5297'	'0.9834'	'0.0931'
\delta	'0'	'0'	'0.012'	'0'	'0.0791'
\eta_L	'0.0103'	'0.0248'	'0.5356'	'0.0103'	'0.0684'
\vartheta_P	'0'	'0'	'0.0001'	'0'	'0.0588'
\gamma_H	'0.5184'	'1'	'0.6332'	'1'	'0.0847'
z	'14.07'	'22.7066'	'16.5386'	'16.1816'	'0.0778'
\eta_\vartheta	'0.2315'	'1'	'0.8644'	'0.3037'	'0.0805'
a_L	'5.0636'	'8.9076'	'4.6565'	'6.9961'	'0.0832'
b_L	'10.7421'	'15'	'7.5694'	'14.9978'	'0.0981'
a_\mu	'1.3325'	'14.3'	'8.1209'	'2.4739'	'0.0736'
b_\mu	'3.66'	'15'	'7.6954'	'14.9972'	'0.0723'
\mu	'0.0002'	'0.006'	'0.456'	'0.0028'	'0.0782'
a_H	'2.2764'	'13.0865'	'4.2014'	'4.7419'	'0.0906'
b_H	'3.4769'	'15'	'8.3737'	'14.9993'	'0.0798'
\nu	'215.8381'	'287.0415'	'175.843'	'226.7797'	'0.1101'
BP	'659.502'	'680.9908'	'675.5'	'665.5'	'0.1027'
reg	'0.2237'	'0.25'	'0.157'	'0.2498'	'0.0806'

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
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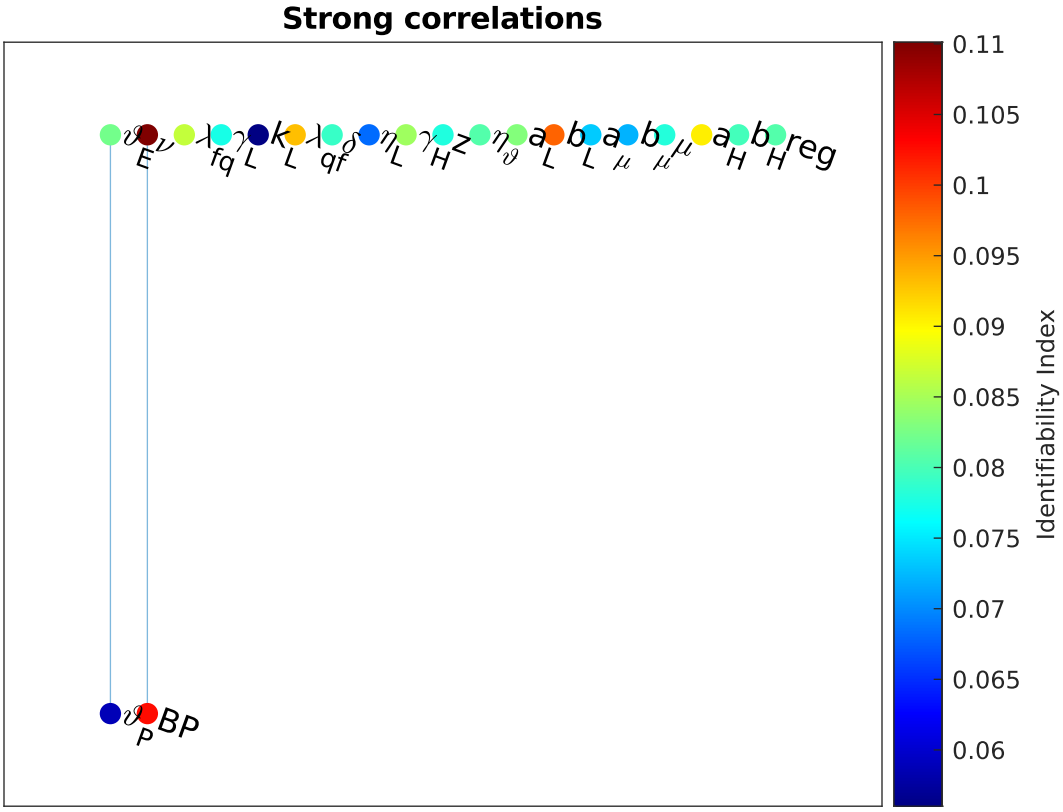
-0.4
-0.6
-0.8
-1


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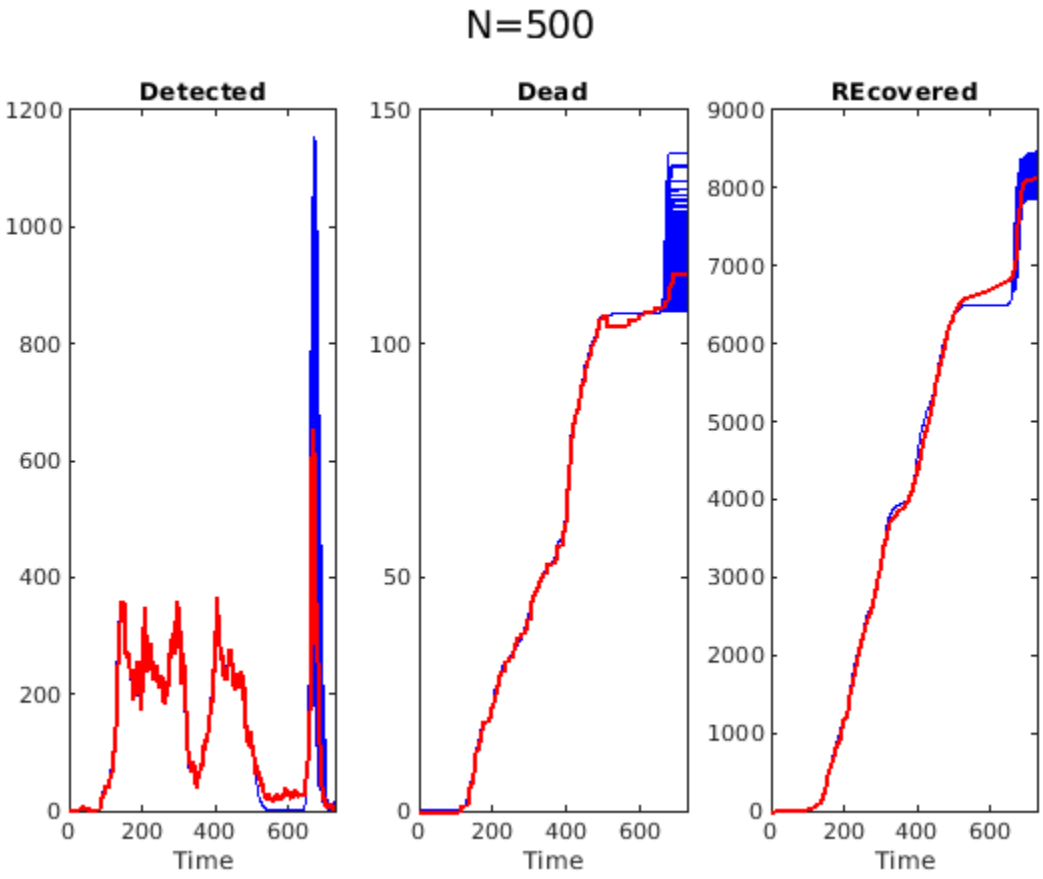
0.095
0.09
0.085
0.08
0.075
0.07
0.065
0.06

16.4. Uncertainty analisys