

Results w simpleFit script Background-First-Order

Binned Likelihood on

Binned Likelihood off

Strategy 1

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.0696195	-0.793507
$R\tau\mu$	-0.0696195	1.0	-0.416863
μ_{all}	-0.793507	-0.416863	1.0

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.0568924	-0.793625
$R\tau\mu$	-0.0568924	1.0	-0.428179
μ_{all}	-0.793625	-0.428179	1.0

Strategy 0

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.0595704	-0.797407
$R\tau\mu$	-0.0595704	1.0	-0.421992
μ_{all}	-0.797407	-0.421992	1.0

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.0587714	-0.791538
$R\tau\mu$	-0.0587714	1.0	-0.427302
μ_{all}	-0.791538	-0.427302	1.0

Results w simpleFit script Background-First-Order Minuit2

Binned Likelihood on

Binned Likelihood off

FVAL = 0.918938532957290111
Edm = 4.77803781134803633e-10
Nfcn = 60
Rbkgmu = 1 +/- 0.0572499 (limited)
Rtaumu = 1 +/- 0.118019 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.00272326 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.003234	-0.0004669	3.552e-11	-0.0001214
1	-0.0004669	0.01391	3.74e-11	-0.0001323
2	3.552e-11	3.74e-11	1	-2.148e-12
3	-0.0001214	-0.0001323	-2.148e-12	7.236e-06

NLL: 125.154

FVAL = 0.91893853320467267
Edm = 2.24205707550329081e-10
Nfcn = 28
Rbkgmu = 1 +/- 0.023875 (limited)
Rtaumu = 1 +/- 0.0739045 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.00103066 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.00329	-0.0004042	0	-0.0001247
1	-0.0004042	0.01399	0	-0.0001361
2	0	0	1	0
3	-0.0001247	-0.0001361	0	7.432e-06

NLL: 125.154

FVAL = 0.91893853134202752
Edm = 1.89806725047714982e-09
Nfcn = 62
Rbkgmu = 1 +/- 0.0561203 (limited)
Rtaumu = 1 +/- 0.117265 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.0026628 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.003194	-0.0003801	-1.917e-11	-0.0001212
1	-0.0003801	0.01397	-2.909e-12	-0.0001368
2	-1.917e-11	-2.909e-12	1	7.661e-13
3	-0.0001212	-0.0001368	7.661e-13	7.306e-06

NLL: -1.21353e+07

FVAL = 0.91893853134202752
Edm = 1.89094568876824442e-10
Nfcn = 35
Rbkgmu = 1 +/- 0.0235087 (limited)
Rtaumu = 1 +/- 0.085437 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.000426689 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.003138	-0.0003863	-1.222e-11	-0.0001187
1	-0.0003863	0.01377	-1.896e-11	-0.0001342
2	-1.222e-11	-1.896e-11	1	6.13e-13
3	-0.0001187	-0.0001342	6.13e-13	7.162e-06

NLL: -1.21353e+07

Strategy 1

Strategy 0

Results w simpleFit script Background-First-Order Minuit

Binned Likelihood on

Binned Likelihood off

Strategy 1

```
FCN=0.918939 FROM HESSE STATUS=OK 31 CALLS 94 TOTAL
EDM=1.09591e-09 STRATEGY= 1 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.46248e-02 4.02716e-06 -1.91179e-08
2 Rtaumu 1.00000e+00 1.17977e-01 1.94705e-03 1.48292e-06
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.59243e-03 4.02716e-07 -6.40477e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
2.987e-03 -5.586e-04 -6.328e-11 -1.098e-04
-5.586e-04 1.398e-02 6.124e-11 -1.298e-04
-6.328e-11 6.124e-11 1.000e+00 1.435e-12
-1.098e-04 -1.298e-04 1.435e-12 6.721e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.89968 1.000 -0.086 -0.000 -0.775
2 0.78019 -0.086 1.000 0.000 -0.423
3 0.00000 -0.000 0.000 1.000 0.000
4 0.91782 -0.775 -0.423 0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.002987	-0.0005586	-6.328e-11	-0.0001098
1	-0.0005586	0.01398	6.124e-11	-0.0001298
2	-6.328e-11	6.124e-11	1	1.435e-12
3	-0.0001098	-0.0001298	1.435e-12	6.721e-06

NLL: 125.154

```
FCN=0.918939 FROM HESSE STATUS=OK 33 CALLS 89 TOTAL
EDM=1.27738e-09 STRATEGY= 1 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.63700e-02 2.01358e-05 -1.05478e-08
2 Rtaumu 1.00000e+00 1.17993e-01 1.94706e-03 7.71729e-07
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.69718e-03 2.71282e-05 -3.19357e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.181e-03 -3.896e-04 -2.070e-11 -1.206e-04
-3.896e-04 1.399e-02 2.321e-12 -1.366e-04
-2.070e-11 2.321e-12 1.000e+00 7.813e-13
-1.206e-04 -1.366e-04 7.813e-13 7.275e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.90653 1.000 -0.058 -0.000 -0.792
2 0.78026 -0.058 1.000 0.000 -0.428
3 0.00000 -0.000 0.000 1.000 0.000
4 0.92411 -0.792 -0.428 0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.003181	-0.0003896	-2.07e-11	-0.0001206
1	-0.0003896	0.01399	2.321e-12	-0.0001366
2	-2.07e-11	2.321e-12	1	7.813e-13
3	-0.0001206	-0.0001366	7.813e-13	7.275e-06

NLL: -1.21353e+07

Strategy 0

```
FCN=0.918939 FROM HESSE STATUS=OK 29 CALLS 95 TOTAL
EDM=7.03904e-11 STRATEGY= 1 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.76709e-02 1.96405e-05 5.11437e-07
2 Rtaumu 1.00000e+00 1.17965e-01 6.08463e-05 4.03602e-06
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.74309e-03 8.47777e-07 -6.97571e-08
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.330e-03 -3.801e-04 -1.877e-12 -1.266e-04
-3.801e-04 1.398e-02 -6.590e-12 -1.370e-04
-1.877e-12 -6.590e-12 1.000e+00 -2.381e-14
-1.266e-04 -1.370e-04 -2.381e-14 7.525e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.91031 1.000 -0.056 -0.000 -0.800
2 0.78032 -0.056 1.000 -0.000 -0.422
3 0.00000 -0.000 -0.000 1.000 -0.000
4 0.92671 -0.800 -0.422 -0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.00333	-0.0003801	-1.877e-12	-0.0001266
1	-0.0003801	0.01398	-6.59e-12	-0.000137
2	-1.877e-12	-6.59e-12	1	-2.381e-14
3	-0.0001266	-0.000137	-2.381e-14	7.525e-06

NLL: 125.154

```
FCN=0.918939 FROM HESSE STATUS=OK 15 CALLS 45 TOTAL
EDM=1.7486e-09 STRATEGY= 0 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.59867e-02 2.01358e-05 -5.27391e-09
2 Rtaumu 1.00000e+00 1.17072e-01 6.08392e-05 3.85864e-07
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.67622e-03 2.01358e-06 1.74663e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.138e-03 -3.863e-04 -1.222e-11 -1.187e-04
-3.863e-04 1.377e-02 -1.896e-11 -1.342e-04
-1.222e-11 -1.896e-11 1.000e+00 6.130e-13
-1.187e-04 -1.342e-04 6.130e-13 7.162e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.90518 1.000 -0.059 -0.000 -0.792
2 0.77756 -0.059 1.000 -0.000 -0.427
3 0.00000 -0.000 -0.000 1.000 0.000
4 0.92294 -0.792 -0.427 0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.003138	-0.0003863	-1.222e-11	-0.0001187
1	-0.0003863	0.01377	-1.896e-11	-0.0001342
2	-1.222e-11	-1.896e-11	1	6.13e-13
3	-0.0001187	-0.0001342	6.13e-13	7.162e-06

NLL: -1.21353e+07

Results w simpleFit script Signal-First-Order

Binned Likelihood on

Binned Likelihood off

Strategy 1

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.119168	-0.762109
$R\tau\mu$	-0.119168	1.0	-0.404907
μ_{all}	-0.762109	-0.404907	1.0

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.058062	-0.797434
$R\tau\mu$	-0.058062	1.0	-0.423067
μ_{all}	-0.797434	-0.423067	1.0

Strategy 0

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.0561949	-0.798125
$R\tau\mu$	-0.0561949	1.0	-0.423509
μ_{all}	-0.798125	-0.423509	1.0

	$Rbkg\mu$	$R\tau\mu$	μ_{all}
$Rbkg\mu$	1.0	-0.0587714	-0.791538
$R\tau\mu$	-0.0587714	1.0	-0.427302
μ_{all}	-0.791538	-0.427302	1.0

Results w simpleFit script Signal-First-Order Minuit2

Binned Likelihood on

FVAL = 0.918938532942738195
Edm = 4.67573718987641148e-10
Nfcn = 57
Rbkgmu = 1 +/- 0.0575174 (limited)
Rtaumu = 1 +/- 0.118161 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.0027375 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.002854	-0.0007416	-7.13e-12	-0.0001009
1	-0.0007416	0.01357	-3.261e-11	-0.0001169
2	-7.13e-12	-3.261e-11	1	-2.097e-13
3	-0.0001009	-0.0001169	-2.097e-13	6.139e-06

NLL: 125.154

FVAL = 0.918938533190120754
Edm = 1.884731238193774e-10
Nfcn = 38
Rbkgmu = 1 +/- 0.0228026 (limited)
Rtaumu = 1 +/- 0.0841262 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.000560512 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.003282	-0.0003799	-1.28e-11	-0.0001246
1	-0.0003799	0.01393	-1.921e-11	-0.0001362
2	-1.28e-11	-1.921e-11	1	6.396e-13
3	-0.0001246	-0.0001362	6.396e-13	7.431e-06

NLL: 125.154

Binned Likelihood off

FVAL = 0.91893853134202752
Edm = 2.81732922225723782e-09
Nfcn = 63
Rbkgmu = 1 +/- 0.0561203 (limited)
Rtaumu = 1 +/- 0.117265 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.0026628 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.003282	-0.0003931	-3.196e-12	-0.0001245
1	-0.0003931	0.01397	-4.804e-12	-0.0001362
2	-3.196e-12	-4.804e-12	1	1.597e-13
3	-0.0001245	-0.0001362	1.597e-13	7.426e-06

NLL: -1.21353e+07

FVAL = 0.91893853134202752
Edm = 1.89094568876824442e-10
Nfcn = 35
Rbkgmu = 1 +/- 0.0235087 (limited)
Rtaumu = 1 +/- 0.085437 (limited)
alpha_Dummy = 0 +/- 0.993347 (limited)
mu_all = 1 +/- 0.000426689 (limited)
Info in Minuit2Minimizer::Hesse : Hesse is valid - matrix is accurate

4x4 matrix is as follows

	0	1	2	3
0	0.003138	-0.0003863	-1.222e-11	-0.0001187
1	-0.0003863	0.01377	-1.896e-11	-0.0001342
2	-1.222e-11	-1.896e-11	1	6.13e-13
3	-0.0001187	-0.0001342	6.13e-13	7.162e-06

NLL: -1.21353e+07

Strategy 1

Strategy 0

Results w simpleFit script Signal-First-Order Minuit

Binned Likelihood on

Binned Likelihood off

Strategy 1

```
FCN=0.918939 FROM HESSE STATUS=OK 27 CALLS 79 TOTAL
EDM=1.59416e-09 STRATEGY= 1 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.64529e-02 4.02716e-06 -7.97098e-09
2 Rtaumu 1.00000e+00 1.15322e-01 1.21693e-05 6.18952e-07
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.61753e-03 4.02716e-07 -2.67312e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.190e-03 -7.032e-04 -6.004e-11 -1.166e-04
-7.032e-04 1.336e-02 -8.558e-11 -1.164e-04
-6.004e-11 -8.558e-11 1.000e+00 2.904e-12
-1.166e-04 -1.164e-04 2.904e-12 6.851e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.90601 1.000 -0.108 -0.000 -0.789
2 0.77192 -0.108 1.000 -0.000 -0.385
3 0.00000 -0.000 -0.000 1.000 0.000
4 0.91956 -0.789 -0.385 0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.00319	-0.0007032	-6.004e-11	-0.0001166
1	-0.0007032	0.01336	-8.558e-11	-0.0001164
2	-6.004e-11	-8.558e-11	1	2.904e-12
3	-0.0001166	-0.0001164	2.904e-12	6.851e-06

NLL: 125.154

```
FCN=0.918939 FROM HESSE STATUS=OK 39 CALLS 97 TOTAL
EDM=1.19072e-09 STRATEGY= 1 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.73243e-02 6.28490e-04 -1.05478e-08
2 Rtaumu 1.00000e+00 1.18000e-01 1.94706e-03 7.71729e-07
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.72616e-03 2.71282e-05 -3.19357e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.290e-03 -4.029e-04 -5.820e-14 -1.247e-04
-4.029e-04 1.399e-02 -2.060e-13 -1.361e-04
-5.820e-14 -2.060e-13 1.000e+00 -7.646e-16
-1.247e-04 -1.361e-04 -7.646e-16 7.432e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.90923 1.000 -0.059 -0.000 -0.797
2 0.78029 -0.059 1.000 -0.000 -0.422
3 0.00000 -0.000 -0.000 1.000 -0.000
4 0.92578 -0.797 -0.422 -0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.00329	-0.0004029	-5.82e-14	-0.0001247
1	-0.0004029	0.01399	-2.06e-13	-0.0001361
2	-5.82e-14	-2.06e-13	1	-7.646e-16
3	-0.0001247	-0.0001361	-7.646e-16	7.432e-06

NLL: -1.21353e+07

Strategy 0

```
FCN=0.918939 FROM HESSE STATUS=OK 15 CALLS 53 TOTAL
EDM=1.58122e-09 STRATEGY= 0 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.70996e-02 2.01358e-05 -1.89725e-08
2 Rtaumu 1.00000e+00 1.17730e-01 6.08463e-05 1.47323e-06
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.72043e-03 2.01358e-06 6.93665e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.264e-03 -3.813e-04 -1.273e-11 -1.239e-04
-3.813e-04 1.392e-02 -1.920e-11 -1.362e-04
-1.273e-11 -1.920e-11 1.000e+00 6.365e-13
-1.239e-04 -1.362e-04 6.365e-13 7.401e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.90858 1.000 -0.057 -0.000 -0.797
2 0.77946 -0.057 1.000 -0.000 -0.424
3 0.00000 -0.000 -0.000 1.000 0.000
4 0.92546 -0.797 -0.424 0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.003264	-0.0003813	-1.273e-11	-0.0001239
1	-0.0003813	0.01392	-1.92e-11	-0.0001362
2	-1.273e-11	-1.92e-11	1	6.365e-13
3	-0.0001239	-0.0001362	6.365e-13	7.401e-06

NLL: 125.154

```
FCN=0.918939 FROM HESSE STATUS=OK 15 CALLS 45 TOTAL
EDM=1.7486e-09 STRATEGY= 0 ERROR MATRIX ACCURATE
EXT PARAMETER INTERNAL INTERNAL
NO. NAME VALUE ERROR STEP SIZE VALUE
1 Rbkgmu 1.00000e+00 5.59867e-02 2.01358e-05 -5.27391e-09
2 Rtaumu 1.00000e+00 1.17072e-01 6.08392e-05 3.85864e-07
3 alpha_Dummy 0.00000e+00 9.93347e-01 1.64512e-04 0.00000e+00
4 mu_all 1.00000e+00 2.67622e-03 2.01358e-06 1.74663e-09
ERR DEF= 0.5
EXTERNAL ERROR MATRIX. NDIM= 25 NPAR= 4 ERR DEF=0.5
3.138e-03 -3.863e-04 -1.222e-11 -1.187e-04
-3.863e-04 1.377e-02 -1.896e-11 -1.342e-04
-1.222e-11 -1.896e-11 1.000e+00 6.130e-13
-1.187e-04 -1.342e-04 6.130e-13 7.162e-06
PARAMETER CORRELATION COEFFICIENTS
NO. GLOBAL 1 2 3 4
1 0.90518 1.000 -0.059 -0.000 -0.792
2 0.77756 -0.059 1.000 -0.000 -0.427
3 0.00000 -0.000 -0.000 1.000 0.000
4 0.92294 -0.792 -0.427 0.000 1.000
```

4x4 matrix is as follows

	0	1	2	3
0	0.003138	-0.0003863	-1.222e-11	-0.0001187
1	-0.0003863	0.01377	-1.896e-11	-0.0001342
2	-1.222e-11	-1.896e-11	1	6.13e-13
3	-0.0001187	-0.0001342	6.13e-13	7.162e-06

NLL: -1.21353e+07