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# **muLAn Documentation**

***Release 2.0 beta***

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## CONTENTS

<b>1</b>	<b>Configuration</b>	<b>3</b>
1.1	Three configuration files . . . . .	3
1.2	The file <code>setup.ini</code> . . . . .	3
1.3	The file <code>observatories.ini</code> . . . . .	5
<b>2</b>	<b>Indices and tables</b>	<b>7</b>
<b>3</b>	<b>Installation</b>	<b>9</b>



Contents:



## CONFIGURATION

### 1.1 Three configuration files

Three configuration files control the code.

#### 1.2 The file `setup.ini`

This file includes several sections that are read by the code.

##### 1.2.1 The Modelling section

As many line `...Models` and `...DateRages` as locations observatory (Earth, Spiter, K2...). Two line mandatory. If do not know, `psbl_par`. `tmin-tmax` with `tmin<tmax`.

##### 1.2.2 The Archive section

The following options are currently supported.

```
[Archive]
Name : trial4
Path : Archive/
```

Every time the code is run, a zip archive is created in the working directory. The field `Name` corresponds to the name given to the archive. It is allowed to choose a personal path by filling the field `path`<sup>1</sup>.

In the example above, a file `trial4.zip` is created in the directory `path-to-working-directory/Archive/`.

##### 1.2.3 Summary

Here is an example of an actual configuration file `setup.ini`.

```
[EventDescription]
Name : OB150966
RA : 17h55m01.02s
```

---

<sup>1</sup> Do not forget the character `/` at the end of any path.

```
DEC : -29d02m49.6s

[Observatories]

Reference : OGLE-I

OGLE-I : 7100-7157, 7159-7230
Spitzer-I : 7100-7230

[Plotting]

Data : True
Type : plottype1
TimeRange : 7100-7230, 5000

[Modelling]

Fit : False
Verbose : 2
Method : grid_dmcmc

EarthModels : psbl_par, esblparall
EarthDateRanges : 7100-7150, 7200-7300

SpitzerModels : psbl_par
SpitzerDateRanges : 7100-7150

t0      : fit, 7205.1937
u0      : fix, -0.01152
tE      : fit, 57.7
rho     : grid, 0.01, 0.1, 20
gamma   : fix, 0.0
piEE    : fix, -0.237
piEN    : fit, -0.0412
s       : fix, 1.1147
q       : fix, 0.000168
alpha   : fit, -2.2619426535897933
dalpha  : fix, 0.0
ds      : fix, 0.0

tp : 7208.88

thetaEN : 0.5
thetaEE : 0.2

[FitSetupDMCMC]

Threads : 7
Chains  : 16
ChainLength : 100000
Resume  : False
Path    : chains/
```



```
[Archive]
```

```
Name : AZERTY
Path : Archives/
```

## 1.3 The file `observatories.ini`

### 1.3.1 The `PlotExcludedData` section

The only option in this section is

```
PlotExcludedData : True
```

that makes the excluded data semi-transparent (`True`) or remove them from the plots (`False`).

### 1.3.2 The `ObservatoriesDetails` section

This section includes all the observational information about the data files. As many options as data files are defined. The values of each option include the name of the observatory, the color associated to it, its location, and an additional list of data points that have to be removed from the data file.

Be carefull, the data file should be dates, magnitude, `e_magn`, seeing, `bkground`.

#### Example

```
OGLE-I : OGLE, 000000, I, Earth, 341-372, 233
Spitzer-I : Spitzer 0.85m, FF0000, I, Spitzer
```

In this example, the code will look for the files `OGLE-I.dat` and `Spitzer-I.dat`<sup>2</sup>. It is highly recommended that the name of the file includes the filter. The corresponding observatories are `OGLE` and `Spitzer 0.85m`. The colours used will be `#000000` and `#FF0000`. The filters are both `I`. The first observatory is on Earth whereas the second one is space-based. It is mandatory that the two files named `Hori-Earth_whatever-you-want.dat` and `Hori-Spitzer_whatever-you-want.dat` including ephemerids exist. Finally, in the case of `OGLE` data, the observations lines 341 to 372 and 233 will be removed. You can include as many data to remove as it is necessary, or nothing.

### 1.3.3 Summary

Here is an example of an actual configuration file `setup.ini`.

```
[PlotOptions]

PlotExcludedData : False


[ObservatoriesDetails]

OGLE-I : OGLE, 000000, I, Earth, 341-372, 233
MOA-I : MOA, 7F0000, I, Earth
DanishLuckyCam-I : Danish 1.54m LuckyCam, 0000FF, I, Earth
DanishDFOSC-I : Danish 1.54m DFOSC, FF7F00, I, Earth
FaulkesNorth-I : Faulkes North 2.0m, 00FFFF, I, Earth
```

<sup>2</sup> The extention can be what ever you like.

```

FaulkesSouth-I : Faulkes South 2.0m, 007F00, I, Earth
Liverpool-I : Liverpool 2.0m, 00A0A0, I, Earth
MonetNorth-I : MONET North 1.2m, C0C0C0, I, Earth
MonetSouth-I : MONET South 1.2m, BF0F00, I, Earth
LcogtCTIOa-I : LCOGT CTIO 1m A, FF00FF, I, Earth
LcogtCTIOb-I : LCOGT CTIO 1m B, FF00FF, I, Earth
LcogtCTIOc-I : LCOGT CTIO 1m C, FF00FF, I, Earth
LcogtSAAOa-I : LCOGT SAAO 1m A, FFAF00, I, Earth
LcogtSAAOb-I : LCOGT SAAO 1m B, FFAF00, I, Earth
LcogtSAAOc-I : LCOGT SAAO 1m C, FFAF00, I, Earth
LcogtSSOa-I : LCOGT SSO 1m A, 7F007F, I, Earth
LcogtSSOb-I : LCOGT SSO 1m B, 7F007F, I, Earth
Utas-I : Utas 1.0m, C07F7F, I, Earth
Perth-I : Perth 0.6m, 00007F, I, Earth
SAAO-I : SAAO 1.0m, 00FF00, I, Earth
CTIO13-I : CTIO 1.3m, 7F7F00, I, Earth
CTIO10-I : CTIO 1.0m, 7F7F00, I, Earth
Hereford-I : Hereford Arizona 0.35m, 007070, I, Earth
Lemmon-I : Mt Lemmon 1.0m, B0FFB0, I, Earth
MDM-I : MDM 2.4m, 00FFFF, I, Earth
Palomar-I : Palomar 60'', FF7F00, I, Earth
Regent-I : Regent Lane, 7F7FC0, I, Earth
Possum-I : Possum 11'', FFAF00, I, Earth
Auckland-I : Auckland 0.4m, 007F00, I, Earth
Hunters-I : Hunters Hill 0.35m, C07F7F, I, Earth
SouthernStars-I : Southern Stars 11'', C0C0C0, I, Earth
FarmCove-I : Farm Cove 0.35m, 0000FF, I, Earth
Kumeu-I : Kumeu Obs 0.35m, 00007F, I, Earth
VintageLane-I : Vintage Lane 0.4m, 7F007F, I, Earth
CBAPerth-I : CBA Perth 0.25m, FF00FF, I, Earth
WiseE2V-I : Wise 1.0m E2V, BF0F00, I, Earth
WiseSITe-I : Wise 1.0m SITe, BF0F00, I, Earth
Bronberg-I : Bronberg 0.35m, 00A0A0, I, Earth
Salerno-I : Salerno 0.35m, 00FF00, I, Earth
Spitzer-I : Spitzer 0.85m, FF0000, I, Spitzer,

```

## INDICES AND TABLES

- `genindex`
- `modindex`
- `search`



## INSTALLATION

*Create a directory.*