UModel

Generated by Doxygen 1.8.14

Contents

Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

Class Documentation

3.1 UModel::_ODEPAR Struct Reference

parameter for ODE Solver

`#include <UModel.h>`

Public Attributes

- void(∗ **DIF**)(int ∗N, double ∗T, double ∗Y, double ∗YDOT, double ∗RPAR, int ∗IPAR) =NULL
- double ∗ **Y**
- double T

  init time
- double TOUT

  end time
- int **NEQ**
- int ∗ **IWORK**
- int **LIW**
- double ∗ **RWORK**
- int **LRW**
- int **ITOL** =1
- double **RTOL** = 1.0E-5
- double **ATOL** = 1.0E-20
- int **ITASK** = 1
- int **ISTATE** = 1
- int **IOPT** =1
- void(∗ **JAC**)(int ∗N, double ∗T, double ∗Y, int ∗ML, int ∗MU, double ∗PD, int ∗NRWORKPD, double ∗RPAR, int ∗IPAR) =NULL
- int **MF** = 22
- int ∗ **IPAR** = NULL
- double ∗ **RPAR** = NULL

3.1.1 Detailed Description

parameter for ODE Solver

see more in any introduction about ODE Solver.

Note

IPAR and RPAR are array send to ODE Solver and Callback Function, and they can be used to record for example address of data which stored additional information required.

Definition at line 114 of file UModel.h.

The documentation for this struct was generated from the following file:

- UModel.h

3.2 UModel::_REAC Struct Reference

`#include <UModel.h>`

Public Attributes

- bool good

  if false, subpress this reaction
- int type

  reaction type. 1-3 for photon/particle ionization. 10 for grain surface reaction.
- int R [6]

  R[0] R[1] record reactants index in SPES, R[2]-R[5] for resultants.
- int **NTR**
- double **ALF** [5]
- double **BET** [5]
- double **GAM** [5]
- double **TINT** [5]
- double **TEND** [5]

3.2.1 Detailed Description

reactions recoeder

Definition at line 70 of file UModel.h.

The documentation for this struct was generated from the following file:

- UModel.h

3.3 UModel::_SPES Struct Reference

Public Attributes

- string **SPECI**
- double **MSPEC**
- double **ESPEC**
- map< string, int > **ATOMS**
- vector< int > **Is**
- vector< int > **Os**

3.3.1 Detailed Description

Definition at line 54 of file UModel.h.

The documentation for this struct was generated from the following file:

- UModel.h

3.4 UModel::_TCV Struct Reference

Public Attributes

- double **t**
- double **NH**
- double **AV**
- double **Temp**
- double **nH**
- double * **K**

3.4.1 Detailed Description

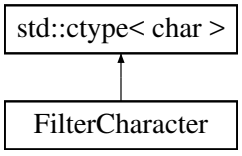
Definition at line 84 of file UModel.h.

The documentation for this struct was generated from the following file:

- UModel.h

3.5 FilterCharacter Class Reference

Inheritance diagram for FilterCharacter:



Public Member Functions

- **FilterCharacter** (const std::string &chars, int initref=1)

3.5.1 Detailed Description

Definition at line 21 of file UModel.cpp.

The documentation for this class was generated from the following file:

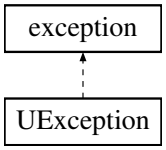
- UModel.cpp

3.6 UException Class Reference

UException class exception may be throwed by UModel class method.

`#include <UModel.h>`

Inheritance diagram for UException:



Public Member Functions

- **UException** (string s)
- const char * **what** () const throw ()

Public Attributes

- string **s**

3.6.1 Detailed Description

UException class exception may be throwed by UModel class method.

Definition at line 21 of file UModel.h.

The documentation for this class was generated from the following files:

- UModel.h
- UModel.cpp

3.7 UModel Class Reference

UModel Class.

```
#include <UModel.h>
```

Classes

- struct _ODEPAR

  parameter for ODE Solver
- struct _REAC
- struct _SPES
- struct _TCV

Public Member Functions

- bool **initATOMS** ()
- bool initSPECS (string fspecs) throw (UException)
- bool initRATES (string fratea) throw (UException)

  read reaction rate file
- bool initYDOT () throw (UException)

  relate each specie(s) to reaction(s).
- bool createYDOTFile (string s) throw (UException)

  create file "Uode.cpp", which contain defination of YDOT(...)
- double NH (double t)

  get Column dnesity of NH at time t
- double nH (double t)

  get number density at time t
- double Temp (double t)

  get temperature at time t
- double AV (double NH)

  FUNCTION FOR EXTINCTION AT V-BAND.
- double **AUV** (double NH)
- void RATES (double t)

  save NH, nH, Temp, AV, Time at time t to [struct _TCV TCV]
- double **K** (int i, double Temp, double AV)
- void **ODESOLVER** ()
- bool **run** ()
- bool **test** ()

Public Attributes

- map< string, double > **ATOMS**
- double **initTime**
- int **NSPECS** =0
- int **NCONS** =0
- int **NPAR** =0
- double **TOTAL** [10]
- double **X** [10]
- _SPES * **SPES**
- int **NREAC** =0
- _REAC * **REAC**
- _TCV **TCV**
- double ZETA =1.0
- double ALBEDO =0.5

  GRAIN ALBEDO (FOR COSMIC-RAY-INDUCED PHOTON RATES)
- double **Y** [1000] ={0.0}
- double **times** [1000]
- double(* **abuns**)[1000] =NULL
- double **HNRs** [1000]
- _ODEPAR **ODEPAR**

3.7.1 Detailed Description

UModel Class.

UModel object can

- parse file
  - .specs: load species to be take into acount to UModel::_SPES SPES
  - .rates: load species to be take into acount to UModel::_REAC REAC
- create Uode.cpp file, define void YDOT(...), used as a callback function of ODE Solver
- set time-dependent variables at UModel::_TCV TCV
  - NH: Column dnesity
    - created by ...
  - nH: Number density
  - Temp: Temperature
  - AV: Extinction at V band
  - K: Reaction rates
  - t: time
- run single point chemical evolution model.

Definition at line 47 of file UModel.h.

3.7.2 Member Function Documentation

3.7.2.1 initSPECS()

```
bool UModel::initSPECS (
            string fspecs ) throw UException)
```

Parameters

	index	
in	*fspecs*	the species file

Returns

-false fail *-true* succeed

example:

```
initSPECS("gasrun.specs");
```

Precondition

fspecs exist under search path, default "./"read species to be take into acount, and set initial abuandance.

Definition at line 85 of file UModel.cpp.

3.7.3 Member Data Documentation

3.7.3.1 ZETA

```
double UModel::ZETA =1.0
```

COSMIC-RAY IONISATION RATE SCALING FACTOR

Definition at line 95 of file UModel.h.

The documentation for this class was generated from the following files:

- UModel.h
- UModel.cpp

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