k2age

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Public Attributes

- **primary_mass**
- **secondary_mass**
- **primary_radius**
- **secondary_radius**
- **metallicity**
- **eccentricity**
- **semi_major_axis**
- **v_angular_A**
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- **c2**

2.1.1 Constructor & Destructor Documentation

2.1.1.1 def k2age.binary.Binary.__init__ (*self*, *primary* = None, *secondary* = None, *eccentricity* = None, *semi_major_axis* = None, *v_angular_orbit* = None)

Constructor for the binary system.

Parameters

self	Binary object reference.
primary	Star object for primary.
secondary	Star object for secondary.
eccentricity	Eccentricity of the binary orbit.
semi_major_axis	Semi-major axis of the binary orbit (Rsun).
v_anuglar_orbit	Mean orbital angular velocity (optional).

2.1.2 Member Function Documentation

2.1.2.1 def k2age.binary.Binary.convolveTracks (*self*, *primary_track* = None, *secondary_track* = None)

Convolve two model mass tracks to get the k2-age relation.

The convolution of the two mass tracks takes the weighted average of the individual $k_{2,i}$ values. This is presented in Equation (5) of Feiden & Dotter (2013). $\overline{k_2} = \frac{c_{2,1}k_{2,1}+c_{2,2}k_{2,2}}{c_{2,1}+c_{2,2}}$.

Parameters

self	Binary object.
primary_track	Mass track of the primary star.
secondary_track	Mass track of the secondary star.

2.1.2.2 def k2age.binary.Binary.getC2Coefficients (*self*)

Compute $c_{2,i}$ coefficients.

These coefficients weight the individual k2 values to derive a weighted average of the two binary components. They are computed according to Equation (2) in Feiden & Dotter (2013), $c_{2,i} = \left[\left(\frac{\Omega_i}{\Omega_K}\right)^2\left(1+\frac{m_{3-i}}{m_i}\right)f(e)+\frac{15m_{3-i}}{m_i}g(e)\right]\left(\frac{R_i}{A}\right)^5$.

Parameters

self	Binary system object.

2.1.2.3 def k2age.binary.Binary.k2Age (*self*, *binary_track* = None, *age_list* = None, *k2* = None)

Interpolate along binary track to find the age using $\overline{k_2}$.

Parameters

self	Binary object.
binary_track	Convolved binary track.
age_list	List of ages for convolved binary track.
k2	Observed weighted apsidal motion constant.

2.1.2.4 def k2age.binary.Binary.printToFile (*self*, *ages* = None, *k2_track* = None)

Print binary track out to a file.

Parameters

self	Binary object.
ages	Set of ages for convolved binary track.
k2_track	List of k2 values to be output.

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

- k2age/binary.py

2.2 k2age.tracks.DsepModel Class Reference

Public Member Functions

- def __init__

  Constructor for mass track generator.
- def getMassTrack

  Get model mass track by interpolating in model grid.
- def loadMassTrack

  Load requested mass track into an array.
- def getFileName

  Create filename for a star or for the two nearest grid points.
- def setEqualGrid

  Set mass track onto an evenly spaced grid.
- def massTrackInterpolate

  Interpolate between two mass tracks.

Public Attributes

- **mass_id**
- **feh_id**
- **mass_list**
- **feh_list**
- **log_ages**
- **ages**
- **directory**

2.2.1 Constructor & Destructor Documentation

2.2.1.1 def k2age.tracks.DsepModel.__init__ (*self*)

Constructor for mass track generator.

Parameters

self	Model mass track object.

2.2.2 Member Function Documentation

2.2.2.1 def k2age.tracks.DsepModel.getFileName (*self*, *mass* = None, *metallicity* = None)

Create filename for a star or for the two nearest grid points.

Parameters

self	Model set object.
mass	Mass of the model.
metallicity	Metallicity of the model.

2.2.2.2 def k2age.tracks.DsepModel.getMassTrack (*self*, *mass* = None, *metallicity* = None)

Get model mass track by interpolating in model grid.

Parameters

self	Model set object.
mass	Mass of the requested track.
metallicity	Metallicity of the requested track.

2.2.2.3 def k2age.tracks.DsepModel.loadMassTrack (*self*, *filename* = None)

Load requested mass track into an array.

Parameters

self	Model track object.
filename	File name of the mass track to be loaded.

2.2.2.4 def k2age.tracks.DsepModel.massTrackInterpolate (*self*, *mass_track_1* = None, *mass_track_2* = None, *x_1* = None, *x_2* = None, *x_new* = None, *set_equal_grid* = True)

Interpolate between two mass tracks.

Parameters

self	Model track set object.
mass_track_1	Array containing the first mass track.
mass_track_2	Array containing the second mass track.
x_1	Value of the dependent variable for mass_track_1.
x_2	Value of the dependent variable for mass_track_2.
x_new	Value of the new dependent variable.
set_equal_grid	Flag to set track on an equally spaced grid.

2.2.2.5 def k2age.tracks.DsepModel.setEqualGrid (*self*, *mass_track* = None)

Set mass track onto an evenly spaced grid.

Parameters

self	Model track set object.
mass_track	Mass track to be set on an even grid.

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

- k2age/tracks.py

2.3 k2age.star.Star Class Reference

Public Member Functions

- def __init__

Constructor for mass track loader.

- def massTrack

  Load the appropriate mass track for the star.

Public Attributes

- **mass**
- **radius**
- **average_density**
- **metallicity**
- **angular_velocity**

2.3.1 Constructor & Destructor Documentation

2.3.1.1 def k2age.star.Star.__init__ (*self*, *mass* = None, *radius* = None, *metallicity* = None, *angular_velocity* = None)

Constructor for mass track loader.

Parameters

mass	Mass of the star.
radius	Observed radius of the star.
metallicity	Metallicity of the star.
angular_velocity	Angular velocity of the star (optional).

2.3.2 Member Function Documentation

2.3.2.1 def k2age.star.Star.massTrack (*self*, *model_set* = None)

Load the appropriate mass track for the star.

Parameters

self	Star object.
model_set	Stellar evolution model object.

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

- k2age/star.py