Cambios en red_corr.py 23 Oct 2014 Valentina

The labels of extinction laws suffered from severely inconsistent naming
The docstrings were, at best, vague and, in several cases, wrong.
The changes are described in this file.

'CCM 89':

Ok

Nuevo nombre:

'CCM 89' -> 'CCM89'

'Fitz AVGLMC':

Fitzpatrick 1999, PASP, 11, 63
http://adsabs.harvard.edu/abs/1999PASP..111...63F
Fitzpatrick & Massa 1988, ApJ, 328, 734
http://adsabs.harvard.edu/abs/1988ApJ...328..734F
Misselt, Clayton and Gordon 1999, ApJ, 515, 128
http://adsabs.harvard.edu/abs/1999ApJ...515..128M

Comments:
The Fitzpatrick law in the UV depends on 6 parameters, stored in RedCorr.FitzParams and
either set by the user or predefined
This method defines a set of parameters appropriate for the LMC according to the Mal99 paper
Other sets can be chosen to fit specific extinction curves in the UV
In the Opt/IR, same as Fitz
Depends on R_V

Problemas:

- El autor se llama Fitzpatrick. Llamarlo Fitz es demasiado coloquial y además incoherente con los otros labels.
- No hay referencia al año
- AVGLMC es indescifrable.
- La ley que depende de 6 parámetros es de Fitzpatrick y Massa y no solo de Fitzpatrick
- Los datos no vienen de Mal99 sino de FM98.

Nuevo nombre y redacción:

'Fitz AVGLMC' -> 'F88 F99 AVG LMC'

```
def _F88_F99_AVG_LMC(self, wave):
        """
        This method returns:
        - in the UV, the average LMC extinction curve derived by Fitzpatrick & Massa 1988
```

```
        - in the opt/IR, the R-dependent extinction curve proposed by Fitzpatrick 1999.

        Fitzpatrick 1999, PASP, 11, 63
        http://adsabs.harvard.edu/abs/1999PASP..111...63F
        Fitzpatrick & Massa 1988, ApJ, 328, 734
        http://adsabs.harvard.edu/abs/1988ApJ...328..734F

        Comments:
        The Fitzpatrick and Massa law in the UV depends on 6 parameters, stored in
RedCorr.FitzParams and
        here set to the LMC values derived in FM88
        R_V must be provided, as the law depends on it

        Scope:
        UV through IR

        """
```

'oD 94':

O'Donnell 1994, ApJ, 422, 1580
http://adsabs.harvard.edu/abs/1994ApJ...422..158O
Cardelli, Clayton & Mathis 1989, ApJ 345, 245
http://adsabs.harvard.edu/abs/1989ApJ...345..245C

Comments:
Same as CCM89 for x<1.1 and x>3.3
Revised values for 1.1<x<3.3
Produces lower correction in the near UV at low R_V

Scope:
UV through IR

Problemas:

- Habría que añadir referencia a Cardelli et al 1989 ya que la mayor parte de la ley es suya.

Nuevo nombre y redacción:

'oD 94' -> 'CCM89 oD94'

```
    def _CCM89_oD94(self, wave):
        """
        Galactic extinction law based on Cardelli et al 1989, modified by O'Donnel 1994
        for 1.1 < x < 3.3 (9100 < lambda < 3030)

        O'Donnell 1994, ApJ, 422, 1580
        http://adsabs.harvard.edu/abs/1994ApJ...422..1580
        Cardelli, Clayton & Mathis 1989, ApJ 345, 245
        http://adsabs.harvard.edu/abs/1989ApJ...345..245C

        Comments:
        Same as CCM89 for x<1.1 and x>3.3
        Revised values for 1.1<x<3.3
        Produces lower correction in the near UV at low R_V

        Scope:
        UV through IR

        """
```

'Fitz IDL':
Fitzpatrick 1999, PASP, 11, 63
http://adsabs.harvard.edu/abs/1999PASP..111...63F
Fitzpatrick & Massa 1988, ApJ, 328, 734
http://adsabs.harvard.edu/abs/1988ApJ...328..734F

Comments:
The Fitzpatrick law in the UV depends on 6 parameters, stored in RedCorr.FitzParams and
either set by the user or predefined
Depends on R_V; the dependence with R_V follows the interpolation of the IDL routine mentioned in the F99 paper

Scope:
UV through IR

Problemas:
Los problemas de nombre y descripción de los otros métodos de Fitzpatrick & Massa.
Aparte, no veo la utilidad de mantener un duplicado de otro método. Además ya ni siquiera es IDL sino python.
La cambio y la comento.

Nuevo nombre y redacción:

'Fitz IDL' -> 'F99-like IDL'

```
    def _F99_like_IDL(self, wave):

        """
        Same as F_99_like, but with a different function in the opt/IR fitting, based on an IDL program
        provided by F99. The results should be identical.

        In the UV, it returns the Fitzpatrick & Massa 1990 law.
        In the opt/IR, it returns the Fitzpatrick 1990 law.

        Fitzpatrick 1999, PASP, 11, 63
        http://adsabs.harvard.edu/abs/1999PASP..111...63F
        Fitzpatrick & Massa 1990, ApJS, 72, 163
        http://adsabs.harvard.edu/abs/1990ApJS...72..163F

        Comments:
        The FM90 depends on 6 parameters which must be set by the user and are stored in RedCorr.FitzParams.
        For the predefined set of parameters defined in FM99, use instead the F_99 method.
        R_V must be provided, as the law depends on it. The dependence with R_V follows Table 4 in the F99 paper

        Scope:
        Range: UV through IR


        """
```

'S 79 H 83':
Seaton (1979: MNRAS 187, 73) and
Howarth (1983, MNRAS 203, 301) Galactic law

http://adsabs.harvard.edu/abs/1979MNRAS.187P..73S

Problemas:

- El docstring no da info sobre rango de aplicación en lambda.
- Solo aparece una URL, pero dos artículos
- El tramo FIR es de Cardelli et al 1989, pero no se menciona ni en el nombre ni en el docstring

Nuevo nombre y redacción:

'S 79 H 83' -> 'S79 H83 CCM89'

```
def _S79_H83_CCM89(self, wave):
    """
    Galactic extinction law (0-33000 A range):
    - In the UV, from Seaton 1979
    - In the opt/NIR (3600-9100) Howarth 1983
    - In the FIR (9100-33000) Cardelly et al 1989

    Seaton 1979, MNRAS, 187, 73) and
    http://adsabs.harvard.edu/abs/1979MNRAS.187P..73S
    Howarth 1983, MNRAS, 203, 301) Galactic law
    http://adsabs.harvard.edu/abs/1983MNRAS.204.1091H
    Cardelli, Clayton and Mathis 1989, ApJ, 345, 245
    http://adsabs.harvard.edu/abs/1989ApJ...345..245C

    """
```

'K 76':
Kaler 1976, ApJS, 31, 517
http://adsabs.harvard.edu/abs/1976ApJS...31..517K

Comments:
This function returns the correction relative to Hbeta (f_lambda) and not
the extinction law (X(1/lambda)).
It cannot be used for absolute correction.

Scope:
UV through IR

Nuevo nombre:

'K 76' -> 'K76'

'LMC G 03':
Gordon et al. (2003, ApJ, 594,279)
http://adsabs.harvard.edu/abs/2003ApJ...594..279G

Comments:
Average curve for the LMC
R_V = 3.41

Scope:
LMC

Problemas:

- Inconsistencias en el nombre. NOTA: No abrevio Gordon et al 2003 como Gal03 porque genera confusión con Galactic, por lo que solo dejo G03

Nuevo nombre y redacción

'LMC G 03' -> 'G03 LMC'

```
def _G03_LMC(self, wave):
    """
    Extinction curve for the LMC
    Gordon, Clayton  et al. (2003, ApJ, 594,279)
    http://adsabs.harvard.edu/abs/2003ApJ...594..279G

    Comments:
    Average curve for the LMC
    R_V = 3.41

    Scope:
    LMC

    """
```

'Fitz':
Fitzpatrick 1999, PASP, 11, 63
http://adsabs.harvard.edu/abs/1999PASP..111...63F
Fitzpatrick & Massa 1988, ApJ, 328, 734
http://adsabs.harvard.edu/abs/1988ApJ...328..734F

Comments:
The Fitzpatrick law in the UV depends on 6 parameters, stored in RedCorr.FitzParams and either set by the user or predefined
Depends on R_V; the dependence with R_V follows Table 4 in the F99 paper

Scope:
Range: UV through IR

Problemas:

- El nombre es poco transparente y la abreviación "Fitz" injustificada.
- FM88 sobra, no tiene que ver con este método
- La descripción da a creer que los 6 parámetros se pueden definir, cuando en realidad este método los define unívocamente.
- Hasta la última línea, no deja claro que incluye opt/IR
- No dice de donde saca opt/IR

Nuevo nombre y redacción:

'Fitz' -> 'F99'

```
    def _F99(self, wave):
        """
        This method returns the R-dependent IR-through-UV extinction curve proposed by
Fitzpatrick 1999.

        Fitzpatrick 1999, PASP, 11, 63
        http://adsabs.harvard.edu/abs/1999PASP..111...63F
        based on:
        Fitzpatrick & Massa 1990, ApJS, 72, 163
        http://adsabs.harvard.edu/abs/1990ApJS...72..163F

        Comments:
        The Fitzpatrick & Mass 1990 law in the UV depends on 6 parameters, stored in
RedCorr.FitzParams.
        The method sets RedCorr.FitzParams to the values of set in the Fitzpatrick 1999
paper,
        which include an explicit dependence on R_V.
        R_V must be provided, as the law depends on its value.

        Scope:
        UV through IR
        """
```

'Fitz 99':

Sets RedCorr.FitzParams

Fitzpatrick 1999, PASP, 11, 63
http://adsabs.harvard.edu/abs/1999PASP..111...63F

Comments:
The Fitzpatrick law in the UV depends on 6 parameters, stored in RedCorr.FitzParams.
This method defines the default set.
Other sets can be chosen to fit specific extinction curves in the UV
Depends on R_V

Scope:
UV through IR

Problemas:

- El nombre da a creer erróneamente que la ley está tomada de Fitzpatrick 1990. Solo la forma funcional lo es, pero no es la misma ley porque los valores de los 6 parámetros cambian.
- La abreviación "Fitz" es injustificada
- FM88 sobra, no tiene que ver con este método.
- Falta FM90, de quien está tomada la forma funcional en el UV
- Hasta la última línea, no deja claro que incluye opt/IR

Nuevo nombre y redacción:

'Fitz 99' -> 'F99-like':

```
    def _F99_like(self, wave):
        """
        In the UV, it returns the Fitzpatrick & Massa 1990 law.
```

```
        In the opt/IR, it returns the Fitzpatrick 1990 law.

        Fitzpatrick 1999, PASP, 11, 63
        http://adsabs.harvard.edu/abs/1999PASP..111...63F
        Fitzpatrick & Massa 1990, ApJS, 72, 163
        http://adsabs.harvard.edu/abs/1990ApJS...72..163F

        Comments:
        Comments:
        The FM90 depends on 6 parameters which must be set by the user and are stored in
RedCorr.FitzParams.
        For the predefined set of parameters defined in FM99, use instead the F_99
method.
        R_V must be provided, as the law depends on it. The dependence with R_V follows
Table 4 in the F99 paper

        Scope:
        Range: UV through IR

        """
```

'No correction':

No correction, return 0.0

'Gal SM 79':

Savage & Mathis 1979, ARA&A, 17, 73
http://adsabs.harvard.edu/abs/1979ARA%26A..17...73S

Comments:
Average of several extinction laws
R_V=3.1

Scope:
UV through IR
Galactic

Problemas:

Pongo Gal en el nombre por mayor coherencia (las otras leyes no tienen referencia al objeto de aplicación o la tienen al final).

Nuevo nombre y redacción:

'Gal SM 79' -> 'SM79 Gal'

```
    def _SM79_Gal(self, wave):
        """
        Galactic extinction law
        Savage & Mathis 1979, ARA&A, 17, 73
        http://adsabs.harvard.edu/abs/1979ARA%26A..17...73S

        Comments:
        Average of several extinction laws
        R_V=3.1

        Scope:
```

```
        UV through IR
        Galactic

        """
        x = 1e4 / np.asarray([wave]) # inv microns

        X_tab = np.loadtxt(execution_path('Gal_SM79.txt'))
        Xx = np.interp(x, X_tab[:, 0], X_tab[:, 1])
        return np.squeeze(Xx)
```

'B 07':

Blagrave et al 2007, ApJ, 655, 299
http://adsabs.harvard.edu/abs/2007ApJ...655..299B
Cardelli, Clayton & Mathis 1989, ApJ 345, 245
http://adsabs.harvard.edu/abs/1989ApJ...345..245C

Comments:
Same as CCM89 for x<3.3 and x>8
Revised values for 3.3<x<8
Based on observation of Orion stars
Depends on R_V

Scope:
UV through IR

Problemas:

- B07 -> Bal07
- Quizás habría que añadir referencia a Cardelli et al 1989 ya que la mayor parte de la ley es suya.

Nuevo nombre y redacción:

'B 07' -> 'CCM89 Bal07'

```
    def _CCM89_Bal07(self, wave):
        """
        Galactic extinction law based on Cardelli et al 1989, modified by Blagrave et al
2007
        for 3.3 < x < 8 (1250 < lambda < 3030)

        Blagrave et al 2007, ApJ, 655, 299
        http://adsabs.harvard.edu/abs/2007ApJ...655..299B
        Cardelli, Clayton & Mathis 1989, ApJ 345, 245
        http://adsabs.harvard.edu/abs/1989ApJ...345..245C

        Comments:
        Same as CCM89 for x<3.3 and x>8
        Revised values for 3.3<x<8
        Based on observation of Orion stars
        Depends on R_V

        Scope:
        UV through IR

        """
```

En todos los casos, he quitado los espacios entre autor y año porque entorpece la lectura y escritura cuando hay más de un artículo citado.