Mass-Radius realtion

Module for calculating the radius and mass of a white dwarf from effective temperature (Teff) and surface gravity (log*g*) by interpolating the <u>Argentenian</u> (Althaus et al. 2013) or <u>Montreal</u> (Bedard et al. 2020) WD evolutionary models to use as a mass-radius relation.

1. Required packages:
   - Python 3.6 or higher
   - numpy
   - scipy
   - astropy
   - pandas

2. Download the folder WD_mass-radius_relation. Go to the downloaded path in the Terminal and enter python or ipython.

3. Type the following in the terminal :
   import WD_MR_relation as MR

4. To calculate the radius and mass from input Teff and log*g*, use the functions *MR.Radius_from_teff_logg* and *MR.Mass_from_teff_logg* respectively.

For example:

```
In [1]: MR.Radius_from_teff_logg(25000, 7.5, 'Bedard20', 'DA', 'thick')
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Bedard 2020
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using evol. seq.
0.01889530856810663

Out [1]: 0.01889530856810663

In [2]: MR.Radius_from_teff_logg ( [15250,20500] ,[7.8,8.2], 'Bedard20', 'DA', 'thick')
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Bedard 2020
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using evol. seq.
[0.0148238  0.01134232]

Out [2]: array([0.0148238 , 0.01134232])
```

Here, MR.Radius_from_teff_logg (25000, 7.5, 'Bedard20', 'DA', 'thick')

| Teff | log *g* | WD Model either 'Bedard20' or 'Althaus13' | Spectral type either 'DA' or 'DB' | Thickness either 'thick' or 'thin' |

A single value or an array of values (numpy array)