

# URAT-1

URAT-1 is an observational catalog at a mean epoch between 2012.3 and 2014.7; it covers the magnitude range 3 to 18.5 in R-band, with a positional precision of 5 to 40 mas. It covers most of the northern hemisphere and some areas down to -24.8 degrees in declination.

URAT-1 table contains the following columns:

Name	Description	Type	Units
Identifier	source Id in URAT-1 original catalog	varchar	
RA	RA, ICRS at mean epoch	double	deg
DEC	DEC, ICRS at mean epoch	double	deg
RAerror	Position error from model	double	arcsec
DECerror	Position error from model	double	arcsec
Epoch	Epoch for mean URAT1 observation	double	Julian Years
Fmag	mean observed magnitude in URAT bandpass	double	mag
FmagError	URAT photometry error	double	mag
B	APASS B magnitude	double	mag
V	APASS V magnitude	double	mag
g	APASS g magnitude	double	mag
r	APASS r magnitude	double	mag
i	APASS i magnitude	double	mag
Berror	Error on APASS B magnitude	double	mag
Verror	Error on APASS V magnitude	double	mag
gError	Error on APASS g magnitude	double	mag
rError	Error on APASS r magnitude	double	mag
iError	Error on APASS i magnitude	double	mag

## Parameters Detailed description

### Identifier

Official URAT1 star ID numbers consist of 2 parts, the 3-digit zone number (zzz) and the 6-digit running record number (nnnnnn) along a zone.

Thus a URAT1 star number is given by:

URAT1-zzznnnnnn

The main catalog data are arranged in declination zones of 0.2 degree width. Zones are numbered from 1 starting at the South Pole and increasing toward north. The first zone with data in URAT1 is 326 for -25.0 to -24.8 deg DEC. There is a separate file for each zone up to zone 900 near the north celestial pole.

### RA

Positions are on the International Celestial Reference System (ICRS) as represented by the UCAC4 catalog.

Mean observed positions are given at mean epoch of URAT observations (epoch). Thus the epoch is slightly different from star to star, but it is always in the range between 2012.311 and 2014.679.

Range: [0, 360]

### DEC

Positions are on the International Celestial Reference System (ICRS) as represented by the UCAC4 catalog.

Mean observed positions are given at mean epoch of URAT observations (epoch). Thus the epoch is slightly different from star to star, but it is always in the range between 2012.311 and 2014.679.

Range: [-25, 90]

### RAerror

RAerror = posError

posError gives an estimate of the error of the mean position components (ra and dec).

A mean was taken over RA and DEC component errors because they are very similar for most stars.

Here a model is used which include image profile fit (x,y data) errors, atmospheric turbulence, and astrometric reduction error propagations. A systematic error floor of 5 mas was added RMS. The model error is likely a better estimate of the true positional errors than the scatter error, at least for small numbers of observations.

Range: [0.005, 0.429]

### **DECerror**

DECerror = posError

posError gives an estimate of the error of the mean position components (ra and dec).

A mean was taken over RA and DEC component errors because they are very similar for most stars.

Here a model is used which include image profile fit (x,y data) errors, atmospheric turbulence, and astrometric reduction error propagations. A systematic error floor of 5 mas was added RMS. The model error is likely a better estimate of the true positional errors than the scatter error, at least for small numbers of observations.

Range: [0.005, 0.429]

### **Epoch**

Mean epoch of URAT-1 observation.

Range: [2012, 2015]

### **Fmag**

This is the mean, observed magnitude in the 680-762 nm URAT bandpass, calibrated by APASS photometry. This bandpass is between R and I, thus further into the red than UCAC. Observations in non-photometric nights \*are\* included thus the URAT magnitudes need to be taken with caution. Unknown or unrealistic magnitudes are set to NULL. The faintest maybe real celestial object magnitude is about 19.0, while the URAT1 catalog should be complete to about magnitude 18.0.

Range: [0.7, 19.9]

### **FmagError**

The photometric error of URAT bandpass observations is derived from the scatter of individual observations. A systematic error floor of 0.01 mag has been RMS added. Unknown errors are set to NULL.

Range: [0.01, 0.90]

### **B**

APASS B magnitude.

A custom set of APASS (The AAVSO Photometric All-Sky Survey) data was kindly provided to us by Arne Henden to include the DR8 data plus single photometric observations.

For a total of 71614 stars with no DR8 data the DR6 data was used.

Range: [5, 19]

### **V**

APASS V magnitude.

A custom set of APASS (The AAVSO Photometric All-Sky Survey) data was kindly provided to us by Arne Henden to include the DR8 data plus single photometric observations.

For a total of 71614 stars with no DR8 data the DR6 data was used.

Range: [5, 19]

### **g**

APASS g magnitude.

A custom set of APASS (The AAVSO Photometric All-Sky Survey) data was kindly provided to us by Arne Henden to include the DR8 data plus single photometric observations.

For a total of 71614 stars with no DR8 data the DR6 data was used.

Range: [6, 19]

### **r**

APASS r magnitude.

A custom set of APASS (The AAVSO Photometric All-Sky Survey) data was kindly provided to us by

Arne Henden to include the DR8 data plus single photometric observations.  
For a total of 71614 stars with no DR8 data the DR6 data was used.  
Range: [5, 19]

**i**

APASS i magnitude.

A custom set of APASS (The AAVSO Photometric All-Sky Survey) data was kindly provided to us by Arne Henden to include the DR8 data plus single photometric observations.  
For a total of 71614 stars with no DR8 data the DR6 data was used.  
Range: [5, 19]

**Berror**

Error on APASS B magnitude.  
Range: [0.0, 0.9]

**Verror**

Error on APASS V magnitude.  
Range: [0.0, 0.9]

**gError**

Error on APASS g magnitude.  
Range: [0.0, 0.9]

**rError**

Error on APASS r magnitude.  
Range: [0.0, 0.9]

**iError**

Error on APASS i magnitude.  
Range: [0.0, 0.9]