



## HOW TO plot a simple graph from the Exoplanet Catalogue using TOPCAT

You are going to use topcat (Tool for Operations on Catalogues And Tables) developed by Marc Taylor at Bristol University.

First click on “VO CONNECTION ON” (fig 1)

This will open TOPCAT and send the full catalogue using a Virtual Observatory protocol called SAMP.

For security reasons TOPCAT will require you to approve the connection, click on yes

You will then see in the web page the TOPCAT application icon (yellow cat) and in TOPCAT's table list window you will see the Exoplanet.eu catalogue data. If the connection is already opened, click on “send table” to send the data.

click on the grid icon “Display table cell data” to browse the catalogue, highlighted in red on fig 1. The result is shown on fig 2.

The image shows a web interface for a catalog. At the top, there is a 'Load New Table' dialog box with a 'Format: (auto)' dropdown and a 'Location:' input field. Below it are 'Filestore Browser' and 'System Browser' buttons. The main interface has a navigation bar with 'Home', 'All Catalogs', 'Diagrams', 'Bibliography', 'Research', 'Meetings', and 'Other Sites'. A 'VO CONNECTION' toggle is set to 'ON'. A 'Send table' button is visible. The 'Catalog' section includes a 'Download VOTable | CSV | DAT' link and a 'Filter' button. The 'TOPCAT' window is open, showing 'Current Table Properties' for 'Exoplanet.eu catalog' with 941 rows and 62 columns. The 'Table List' shows '1: Exoplanet.eu catalog' with 35 / 1749 M rows. The 'SAMP' section shows 'Messages:' and 'Clients:'.

e	i (deg)	Ang. dist. (arcsec)	Status	Discovery	Upd
0.231	—	0.011664	R	2008	2011-12
0.08	—	0.012887	R	2009	2009-08
—	—	0.010864	R	2008	2012-08
0.369	—	0.153039	R	2002	2009-10
0.689	—	0.078468	R	1996	2012-12
0.08	—	0.035568	R	2008	2008-02
—	—	2.275862	R	2008	2011-12
0.09	—	0.017821	R	2010	2010-07

fig 1 : Catalogue with TOPCAT

The image shows the 'TOPCAT(1): Table Browser' window. The 'Table Browser for 1: Exoplanet.eu catalog' displays a grid view of exoplanet data. The columns are: name, mass, mass error, minmass error max, radius, radius er..., radius er..., orbital period, orbital period..., orbital period..., semi major ..., semi major a..., semi major a..., and eccentricity. The rows list various exoplanets such as 11 Com b, 11 UMi b, 14 And b, 14 Her b, 16 Cyg B b, 18 Del b, 1RXS1609 b, 24 Sex b, 24 Sex c, 2M 0103(AB) b, 2M 0122-2439 b, 2M 044144 b, 2M 0746+20 b, 2M 2140+16 b, 2M 2206-20 b, 2M1207 b, 30 Ari B b, 4 Uma b, 42 Dra b, 47 Uma b, 47 Uma c, 47 Uma d, 51 Peg b, 55 Cnc b, and 55 Cnc c.

name	mass	mass error	minmass error max	radius	radius er...	radius er...	orbital period	orbital period...	orbital period...	semi major ...	semi major a...	semi major a...	eccentrici
1 11 Com b	19.4	1.5	1.5				326.03	0.32	0.32	1.29	0.05	0.05	0.231
2 11 UMi b	10.5	2.47	2.47				516.22	3.25	3.25	1.54	0.07	0.07	0.08
3 14 And b	5.33	0.57	0.57				185.84	0.23	0.23	0.83			
4 14 Her b	4.64	0.19	0.19				1773.4	2.5	2.5	2.77	0.05	0.05	0.369
5 16 Cyg B b	1.68	0.07	0.07				799.5	0.6	0.6	1.68	0.03	0.03	0.689
6 18 Del b	10.3						993.3	3.2	3.2	2.6			0.08
7 1RXS1609 b	14.	3.	2.	1.7						330.			
8 24 Sex b	1.99	0.38	0.26				452.8	4.5	4.5	1.333	0.009	0.009	0.09
9 24 Sex c	0.86	0.22	0.35				883.	14.	14.	2.08	0.02	0.02	0.29
10 2M 0103(AB) b	13.	1.	1.							84.			
11 2M 0122-2439 b	13.	1.	1.							52.	6.	6.	
12 2M 044144 b	7.5	2.5	2.5							15.	0.6	0.6	
13 2M 0746+20 b	30.	25.	25.	0.97	0.06	0.06	4640.	25.	25.	2.897	0.005	0.005	0.487
14 2M 2140+16 b	20.	20.	80.	0.92	0.39	0.39	7340.	584.	584.	3.53	0.15	0.15	0.26
15 2M 2206-20 b	30.	20.	70.	1.3	0.18	0.18	8686.	69.4	69.4	4.48	0.4	0.4	
16 2M1207 b	4.	1.	6.							46.	5.	5.	
17 30 Ari B b	9.88	0.94	0.94				335.1	2.5	2.5	0.995	0.012	0.012	0.289
18 4 Uma b	7.1	1.6	1.6				269.3	1.96	1.96	0.87	0.04	0.04	0.432
19 42 Dra b	3.88	0.85	0.85				479.1	6.2	6.2	1.19	0.01	0.01	0.38
20 47 Uma b	2.53	0.06	0.07				1078.	2.	2.	2.1	0.02	0.02	0.032
21 47 Uma c	0.54	0.073	0.066				2391.	87.	87.	3.6	0.1	0.1	0.098
22 47 Uma d	1.64	0.48	0.29				14002.	5095.	5095.	11.6	2.9	2.9	0.16
23 51 Peg b	0.468	0.007	0.007				4.23077	5.000000E-5	5.000000E-5	0.052			
24 55 Cnc b	0.8	0.012	0.012				14.651	0.0001	0.0001	0.1134	0.0006	0.0006	0.0159
25 55 Cnc c	0.169	0.008	0.008				44.3446	0.007	0.007	0.2403	0.0017	0.0017	0.053

fig 2 : All the data have been transferred to TOPCAT you can visualize values using the grid view

Different plotting tools such as Histogram, graphical plot, or plot on celestial sphere are available see

fig 3

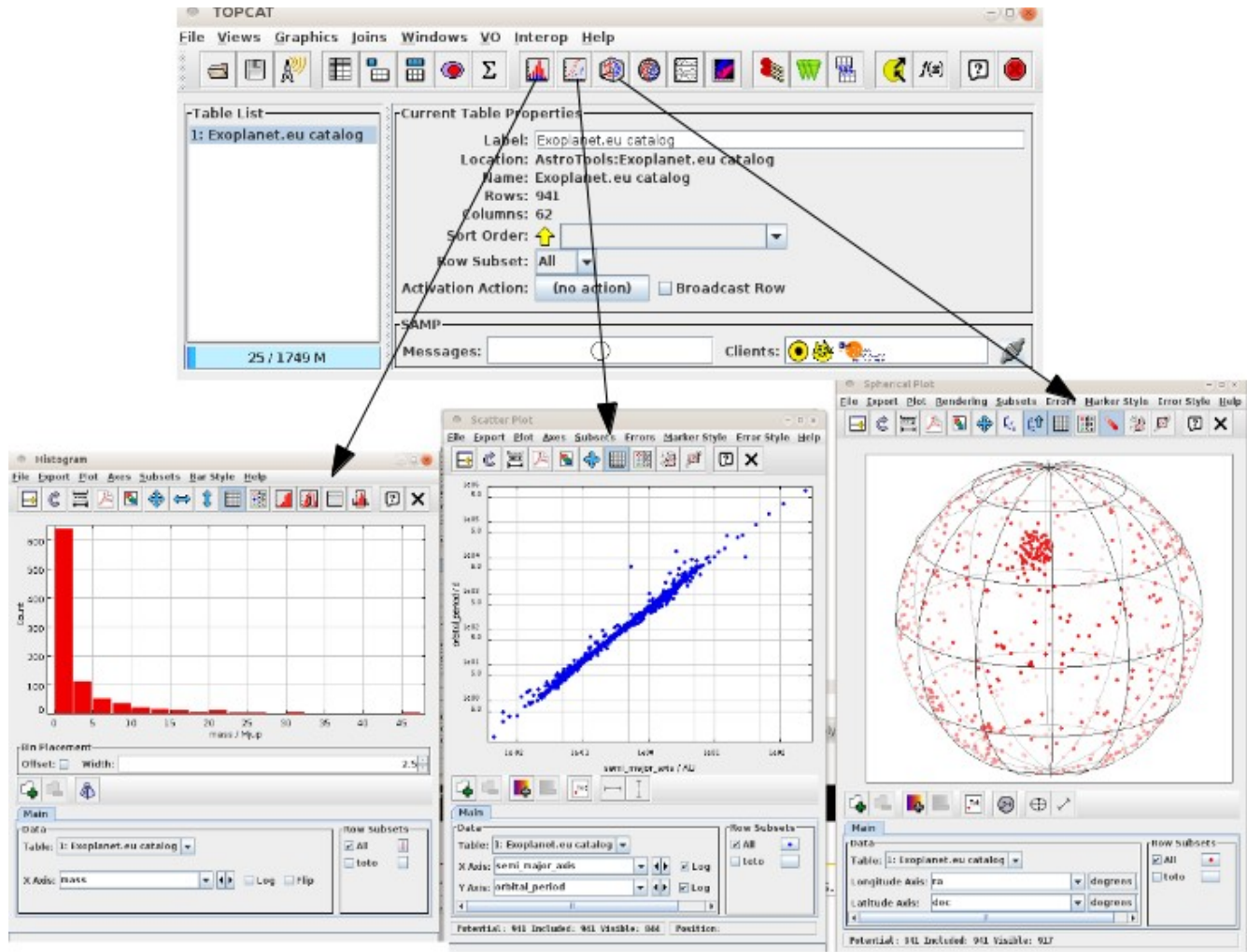


fig 3 : some of the visualisation capabilities of TOPCAT