Virtual Observatory Tools

Astroinformatics Summer School, UQ, 2013

votools.wordpress.com

Virtual Observatory

- **Virtual observatory** (VO) is a collection of interoperating data archives and software tools which utilize the internet to form a scientific research environment in which astronomical research programs can be conducted.

TAP Shell

- http://soft.g-vo.org/dist/tapsh.jar
- java -jar tapsh.jar
- http://docs.g-vo.org/tapsh-manual.html

Topcat - Tool for OPerations on Catalogues And Tables

- http://www.star.bris.ac.uk/~mbt/topcat/topcat-full.jar
- java -jar topcat-full.jar
- http://www.star.bris.ac.uk/~mbt/topcat/sun253/sun253.html

Selecting a database server in tapsh

- Run tapshell in a terminal:

```
java -jar tapsh.jar
```

- Type:

```
server <tab>
```

- Select SDSS DR8 server:

```
server ivo://wfau.roe.ac.uk/sdssdr8-dsa
```

Inspecting database tables

- **Run command:**

  `tables`

Count number of records in a table

- Open a topcat instance from another terminal:

```
java -jar topcat-full.jar
```

  Note the tapshell icon in the clients list in the right bottom area.

- **In the tapshell run the SQL query:**

```
select count(*) from Photoz;
```

- **In the topcat open newly downloaded data table: “results” in the list of tables.**

Find min, max and avg redshifts in the Photoz table.

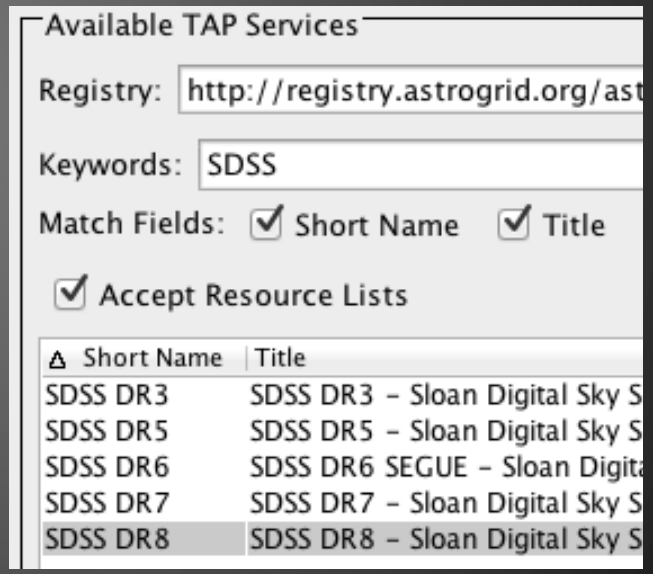
- `select min(z), max(z), avg(z) from Photoz;`

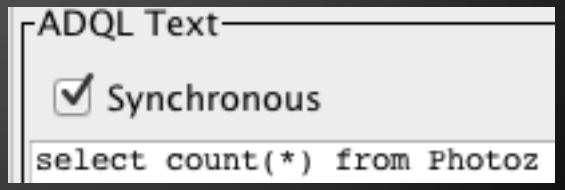
Find top 10 most brightest galaxies in U band

```
select top 10 * from Photoz order by absMagU desc;
```

Colour-magnitude diagram: U-G vs G

- In the topcat click “open a new table” icon.
- In the new opened window click “Select from”/“Query remote databases” icon.
- Select a registry
  (first or the last in the list).
- In the “keyword” field enter
  “SDSS” and hit “Enter”.
- Select SDSS DR8.
- Click “Enter Query” button.
- Use ADQL Text area enter an
  SQL query





Colour-magnitude diagram: U-G vs G

- Count number of galaxies between redshift 0 and 0.1

```
select count(*) from Photoz where z > 0 and z < 0.1
```

Colour-magnitude diagram: U-G vs G

select top 100 absMagG, (absMagU-absMagG) as colour
from Photoz

- Try plotting the data with “Scatter plot” tool.

Colour-magnitude diagram: U-G vs G

select top 100 absMagG, (absMagU-absMagG) as colour
from Photoz

where z > 0 and z < 0.1

Colour-magnitude diagram: U-G vs G

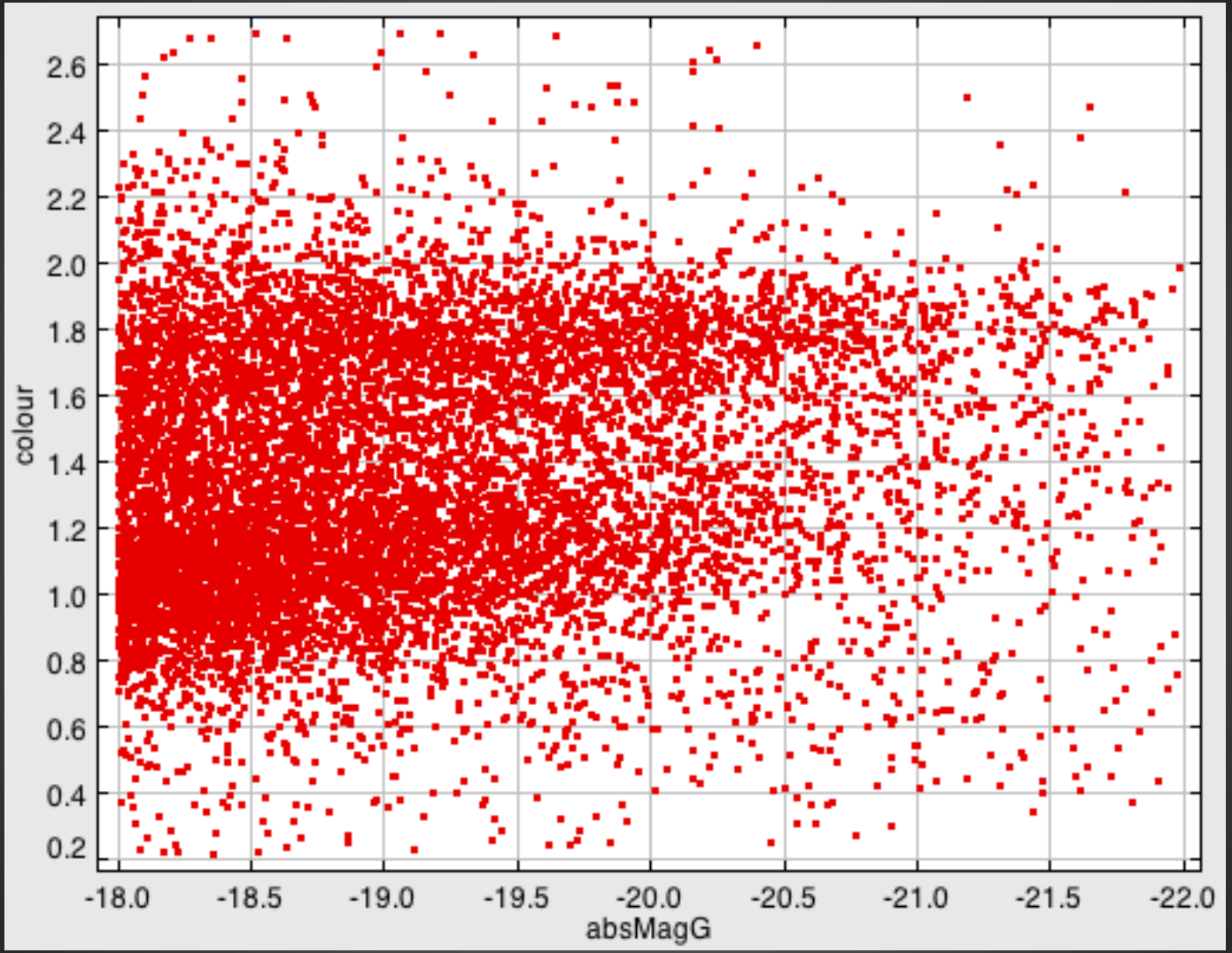
select top 10000 absMagG, (absMagU-absMagG) as colour
from Photoz

where z > 0 and z < 0.1

and absMagG > -22 and absMagG < -18
and (absMagU-absMagG) > 0.2 and (absMagU-absMagG) < 2.7

Colour-magnitude diagram: U-G vs G

- Select the latest result set in the Table list
- Click “Scatter plot icon”
- Check X and Y axis data columns
- Flip X-Axis


colour
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
-18.0
-18.5
-19.0
-19.5
-20.0
-20.5
-21.0
-21.5
-22.0
absMagG

Explore save/open

- Save the results table in a fits file on your computer.
- Check the size of the file.