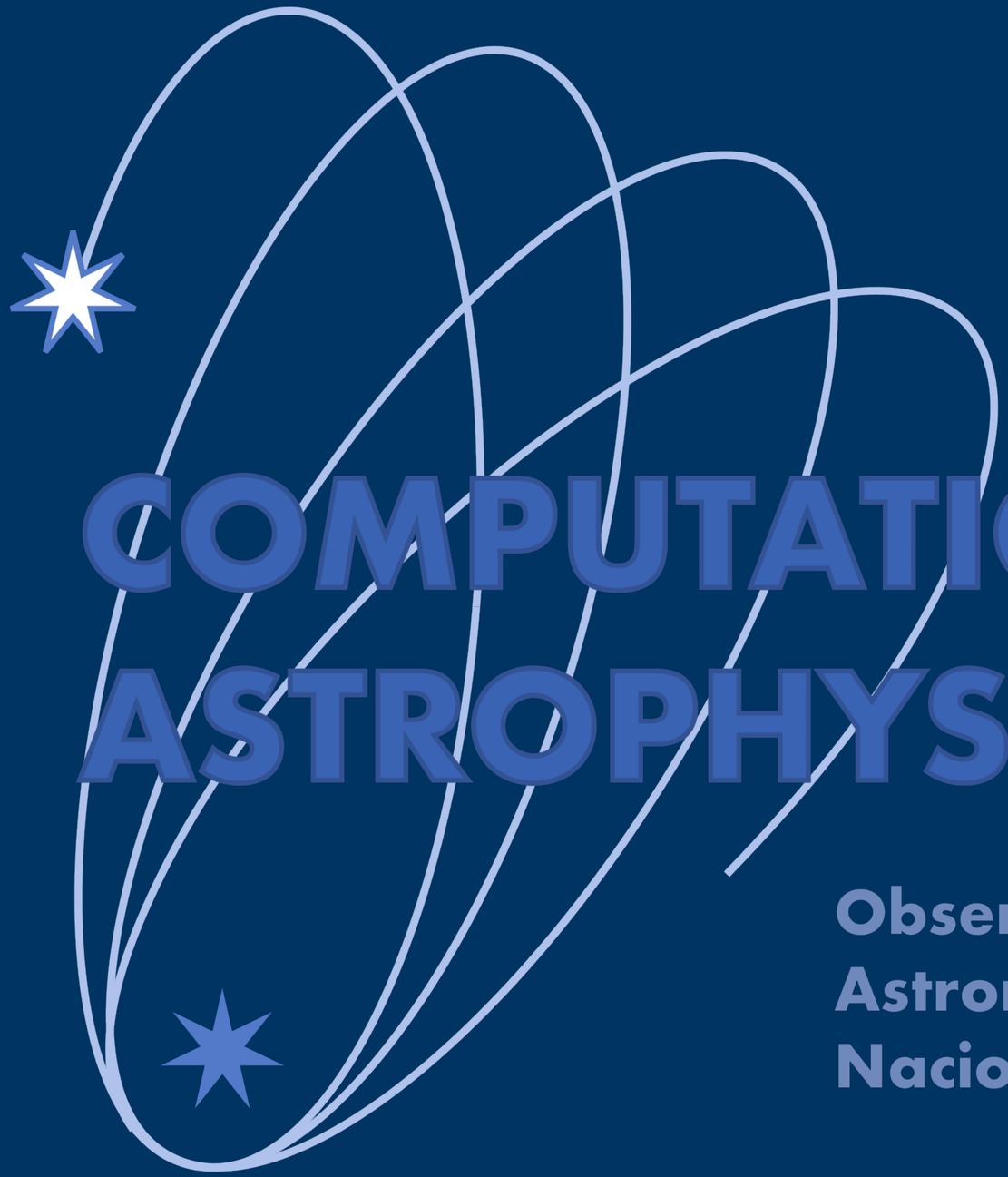

# COMPUTATIONAL ASTROPHYSICS

Observatorio
Astronómico
Nacional

# Computational Astrophysics 2022

## 01. Data in Astrophysics

**Eduard Larrañaga**
**Observatorio Astronómico Nacional**
**Universidad Nacional de Colombia**

# Knowing the Data

# Usual data formats in astrophysics

.txt (plain text)

.fits  (Flexible Image Transport System)

.dat  + ReadMe

VOTable

.csv

# Data files

Feature

Data point or Sample

| Name | z | sigma* | e_sigma* | n_sigma* | FWHM | e_FWHM | ogL | e_logL | logM | E_logM | e_logM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SDSS J000805.62+145023.4** | 0.0454 | 140.0 | 27.0 | | 7610 | 380 | 41.13 | 0.04 | 7.7 | | 0.1 |
| **SDSS J004236.86-104921.8** | 0.0419 | 78.4 | 10.0 | | 1960 | 97 | 41.58 | 0.14 | 6.7 | | 0. |
| **SDSS J011703.58+000027.3** | 0.0456 | 98.8 | 16.0 | | 2270 | 110 | 41.45 | 0.08 | 6.8 | | 0.1 |
| **SDSS J020459.25-080816.0** | 0.0772 | 121.0 | 9.4 | a | 3720 | 180 | 41.13 | 0.05 | 7.0 | | 0.1 |
| **SDSS J020615.99-001729.1** | 0.0426 | 216.0 | 30.0 | | 3860 | 190 | 41.91 | 0.07 | 7.5 | | 0.1 |

# Data files

Non-numerical values

Missing values

| Name | z | sigma* | e_sigma* | n_sigma* | FWHM | e_FWHM | logL | e_logL | logM | E_logM | e_logM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SDSS J000805.62+145023.4** | 0.0454 | 140.0 | 27.0 | | 7610 | 380 | 41.13 | 0.04 | 7.7 | | 0.1 |
| **SDSS J004236.86-104921.8** | 0.0419 | 78.4 | 10.0 | | 1960 | 97 | 41.58 | 0.14 | 6.7 | | 0.1 |
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| **SDSS J020615.99-001729.1** | 0.0426 | 216.0 | 30.0 | | 3860 | 190 | 41.91 | 0.07 | 7.5 | | 0.1 |

# DataBases

## SIMBAD - VizieR

**S**et of
**I**dentifications,
**M**easurements and
**B**ibliography for
**A**stronomical
**D**ata.

# DataBases

**SIMBAD - VizieR** http://simbad.u-strasbg.fr/simbad/

4’500.000 stars

3’500.000 non-stellar objects (galaxies, nebula, clusters, novae, supernovae, etc)

No data for Solar System objects

# DataBases

**SIMBAD - VizieR** http://simbad.u-strasbg.fr/simbad/

Data is used in bibliographical references

# DataBases

**SIMBAD - VizieR** http://simbad.u-strasbg.fr/simbad/

- Type of the object
- Coordinates
- Proper motion
- Radial velocity
- Paralax
- Spectral type
- Redshift
- Integral magnitude
- Flux
- ...

# DataBases

**SDSS** https://www.sdss.org/

**S**loan
**D**igital
**S**ky
**S**urvey

Data Release 16 (DR16): 9 Dec 2019

# DataBases

**SDSS** https://www.sdss.org/

3D map of the Universe with multicolor (photometric bands) images of one third of the sky and spectroscopical data of more than 3 million objects (stars, galaxies, quasars).

# Synthetic Data

We will also use synthetic data in some examples, obtained from known physical models and numerical solution of some systems.

# Conociendo los Datos

- Is your data enough ? Do you need more data?
- How many features do you have? Are them too many? Are them enough?
- Are there missing data values ? Is it possible to drop out those missing values?
- What is the question you want to answer from the data analysis? Is the data enough to answer  that question?

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