Astronomical software

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Common tasks

- Image detection and measurement
- Catalogue matching
- Coordinate conversion (equatorial ↔ Galactic)
- Photometric redshifts
- Spectroscopic redshifts
- K-corrections

Image detection and measurement

- IRAF Image Reduction and Analysis Facility (http://iraf.noao.edu/)
  - easiest for data from NOAO telescopes
- MIDAS (http://www.eso.org/sci/software/esomidas/) is ESO equivalent
- SExtractor (http://www.astromatic.net/software/sextractor)
  - very widely used by many projects

Catalogue matching

- TOPCAT (http://www.star.bris.ac.uk/~mbt/topcat/)
- Also great for making scatterplots, histograms, 3d plots ...
- Command line interface STILTS

Coordinate conversion

- Starlink COCO (download from http://www.starlink.rl.ac.uk/docs/sun56.htx/sun56.html)
- Web services, e.g. http://nedwww.ipac.caltech.edu/forms/calculator.html
- IDL Astronomy Users Library (http://idlastro.gsfc.nasa.gov)
- astLib Python astronomy modules (http://astlib.sourceforge.net/)

Photometric redshifts

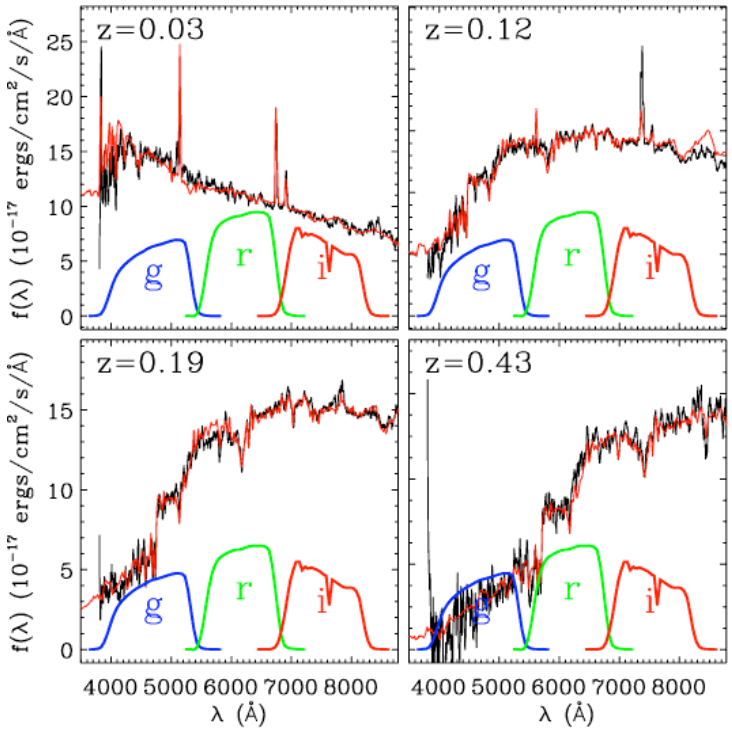
- Approximate redshifts from multi-band photometry
- Two approaches: template fitting and empirical
- Template fitting: Hyperz (http://webast.ast.obs-mip.fr/hyperz/)
- Empirical: ANNz (http://www.homepages.ucl.ac.uk/~ucapola/annz.html)
  - can be used for any neural network application (e.g. morphological classification)

Spectroscopic redshifts

- IRAF Image Reduction and Analysis Facility (http://iraf.noao.edu/)
  - easiest for data from NOAO telescopes
- ESO MIDAS
- Starlink Figaro (http://www.starlink.rl.ac.uk/docs/sun86.htx/sun86.html)
- Most big projects use their own code (e.g. 2dfdr and runz for 2dfGRS and GAMA; SDSS spectro pipeline)

K-corrections

- Correct for fact that fixed observed-frame bandpass samples different parts of a galaxy's restframe SED depending on its redshift
- Depends on SED, redshift and passband
- kcorrect (http://howdy.physics.nyu.edu/index.php/Kcorrect) is widely used
  - C libraries and IDL interface



Summary

- (Free) software exists for many common astronomy applications
- See what’s already available before re-inventing the wheel