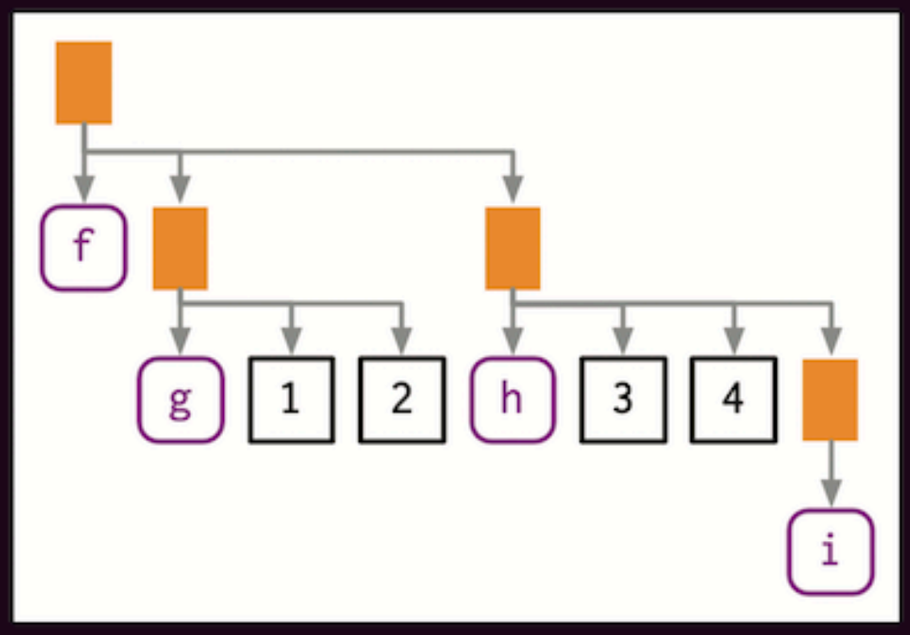
What is advanced R?

The R Series

Advanced R

Second Edition



Hadley Wickham

CRC Press
Taylor & Francis Group
A CHAPMAN & HALL BOOK

Previous sessions

Foundations

2 Names and values

3 Vectors

4 Subsetting

5 Control flow

6 Functions

7 Environments

8 Conditions

Functional programming

9 Functionals

10 Function factories

11 Function operators

Today

Object-oriented programming

12 Base types

13 S3

14 R6

15 S4

16 Trade-offs

Today

Metaprogramming

17 Big picture

18 Expressions

19 Quasiquotation

20 Evaluation

21 Translating R code

22 Debugging

23 Measuring performance

24 Improving performance

25 Rewriting R code in C++

Everything else…

Reproducible research, workflow management

- Project organisation (e.g. here::here())
- Workflow automation (targets, drake, make)
- Dependency management (renv, packrat)

Reproducible reporting

- Quarto
- Parameterised reports and chunk caching

Version control, collaboration

- Git and GitHub/GitLab (branches, pull requests, .gitignore)
- Using Git in RStudio
- Code reviews and collaborative workflows

Testing, debugging

- Unit testing (testthat)
- Debugging tools (browser(), traceback())
- Profiling and benchmarking
- Linting and styling (Air)

Package development

- Building packages (usethis, devtools)
- Documentation (roxygen2, pkgdown)
- Vignettes and manuals
- Continuous integration (GitHub Actions, Travis CI)

Data management, database interoperability

- Databases (DBI, odbc, RPostgres)
- Big data tools (data.table, arrow, duckdb, fst)
- APIs and web scraping (httr2, rvest, jsonlite)
- Geospatial data (sf, terra, leaflet)

Cross-platform code and other languages

- Python integration (reticulate)
- R + C++ (Rcpp, cpp11)
- Interfacing with Java, Julia, etc.

Visualisation, communication

- Interactive dashboards (Shiny)
- Interactive plots (plotly, highcharter)
- Animation and presentation (gganimate, xaringan)
- Custom layouts (patchwork, cowplot)

Statistical/ML Workflows

- Modelling infrastructure (tidymodels, mlr3)
- Hyperparameter tuning (tune)
- Resampling and cross-validation
- Model deployment (vetiver, pins, plumber)

Deployment & Automation

- REST APIs with plumber
- Shiny Server, RStudio Connect
- Scheduling (cronR, GitHub Actions)
- Docker and containerisation
- Cloud integration (AWS, GCP, Azure)

(And more…)

Text editors

Domain-specific

PyCharm

RStudio

General purpose

Vim

Emacs

Sublime Text

Visual Studio Code

plot_galactocentric-frame.py — astropy-testing

New | Open | Search | Python 3.10.13 (Venv: .venv) | astropy-testing

plot_galactocentric-frame.py

```
182
183  ################################################################################
184  # Now we can transform to Galactic coordinates and visualize the rings in
185  # observable coordinates:
186  gal_rings = gc_rings.transform_to(coord.Galactic)
187
188  fig, ax = plt.subplots(1, 1, figsize=(8, 6))
189  for i in range(len(ring_distances)):
190      ax.plot(
191          gal_rings[i].l.degree,
192          gal_rings[i].pm_l_cosb.value,
193          label=str(ring_distances[i]),
194          marker="None",
195          linewidth=3,
196      )
197
198  ax.set_xlim(360, 0)
199
200  ax.set_xlabel("$l$ [deg]")
201  ax.set_ylabel(rf'$\mu_l \, \cos b$ [{(u.mas/u.yr).to_string("latex_inline")}]
```

CONSOLE | TERMINAL | PROBLEMS | OUTPUT | PORTS | DEBUG CONSOLE

Python 3.10.13 (Venv: .venv) ~/Work/rstudio/python-testing-envs/astropy-te...

```
...         linewidth=3,
...     )
...
>>> ax.set_xlim(360, 0)
(360.0, 0.0)
>>> ax.set_xlabel("$l$ [deg]")
Text(0.5, 24.888888888888918, '$l$ [deg]')
>>> ax.set_ylabel(rf'$\mu_l \, \cos b$
[{(u.mas/u.yr).to_string("latex_inline")}]')
Text(24.88888888888889, 0.5, '$\\mu_l \\, \\cos b$ [$\\mathrm{mas\\,yr^{-1}}$]')
>>> ax.legend()
<matplotlib.legend.Legend at 0x121b524d0>
>>> plt.show()
>>>
```

SESSION | HELP | VIEWER | CONNECTIONS | RUNTIMES

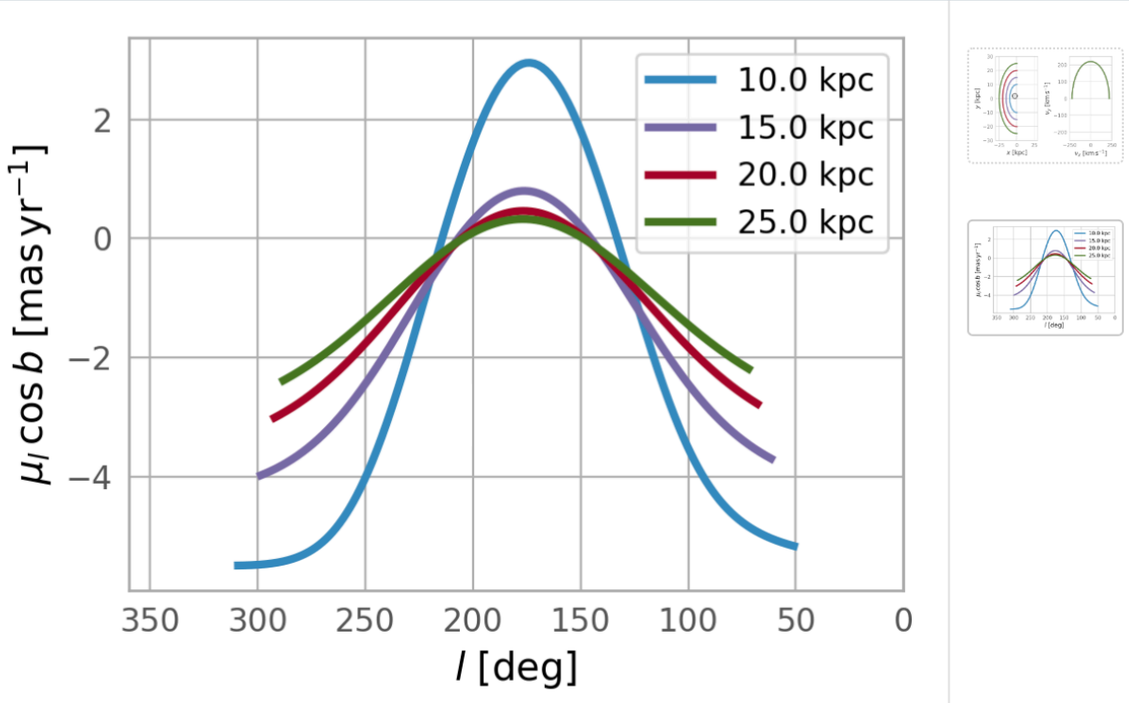
VARIABLES

Python 3.10.13 (Venv: .venv) — filter

fig	<Figure size 800x494 with 1 Axes>	Figure
gal_rings	<SkyCoord (Galactic): (l, b, distance) in (deg, deg, kpc) [...	SkyCoord [121]
galcen_distance	<Quantity 8. kpc>	Quantity [89]
gc_frame	<Galactocentric Frame (galcen_coord=<ICRS Coordi...	Galactocentric [64]
T	<property object at 0x1207fe9d0>	property
cache	<astropy.utils.decorators.lazyproperty object at 0x1210942...	lazyproperty
cartesian	<property object at 0x12109a2f0>	property

PLOTS

Auto



0 0 0 | Ln 206, Col 1 | Spaces: 4 | UTF-8 | LF | Python

https://positron.posit.co/