

R-Studio Resources for the Actuarial Major

4 Main Topics

Data with R

- Objects: <https://youtu.be/-27i7PfGexo>
- Reading data from files: <https://youtu.be/9klmnwZHQyc>
- Saving data to files: <https://youtu.be/xZUCUvPedUI>
- Generating data:
 - Regular sequences: https://youtu.be/V5_vb7gLtrk
 - Random sequences: <https://youtu.be/CM7ncRGIViE>
- Manipulating objects:
 - Creating objects: <https://youtu.be/J5ULEc4Mial>
 - Converting objects: https://youtu.be/_rPde-SPDVE
 - Operators: <https://youtu.be/6PpQS-YLWDQ>
 - Indexing: <https://youtu.be/Tt4vYYCEzLY>
 - Naming objects: <https://youtu.be/0hOpUDW8udA>
 - Arithmetic functions: <https://youtu.be/ovs5Eze1wtA>
 - Creating matrices: <https://youtu.be/2IodT3J5IFM>
 - Matrix arithmetic: <https://youtu.be/GuZQZDCz4hA>

Graphics with R

- Creating basic graphs: <https://youtu.be/UXeJ1bNYCos>
- Plotting multiple graphs: <https://youtu.be/Z3V4Pbxeahg>
- Data partitioning: <https://youtu.be/IAnwpp-p5I4>
- Graphing functions: <https://youtu.be/ZIJYEu0z3eo>
- Plotting
 - Introduction to plotting: <https://youtu.be/SjcUIHh3UJg>
 - Customising plots: <https://youtu.be/0MrYVzPxBlc>
- Grid and lattice graphics: <https://youtu.be/6VP5JBq1g7g>

Statistical Analysis with R

- Analysis of variance: <https://www.youtube.com/watch?v=qrP7evoNCy4>
- Generic functions: <https://www.youtube.com/watch?v=niFjMMDNgZw>
- Packages: https://www.youtube.com/watch?v=e8B9YU_M5FM
 - List of useful packages: <https://support.rstudio.com/hc/en-us/articles/201057987-Quick-list-of-useful-R-packages>

R in Practice

- Loops and vectorisation:
 - <https://www.youtube.com/watch?v=5zOTJ0fOIII>
 - <https://www.youtube.com/watch?v=GqbJcVZxdiE>
- Writing programs: <https://www.youtube.com/watch?v=UX6yNAC2sAc>
- Writing functions: <https://www.youtube.com/watch?v=p8tAQx7ijXE>

Practice problems

- Consider the InsectSprays dataset, which comes provided by default with R. It shows the counts of insects in an agricultural experiment that compares different insecticides (you can read more about it on its help page by running ?InsectSprays).
 1. (a) Do a one-way ANOVA to show that the experiment provides strong evidence that the insect sprays that were tested vary in their effectiveness.
 2. (b) Inspect the data with a boxplot. Is there an assumption we make in the ANOVA that you suspect might not hold?
 3. (c) A square root transformation is often applied to count data to make them more compatible with the ANOVA assumptions. Take the square root of the counts and repeat the ANOVA. Have your conclusions changed?
- Function exercises: <https://www.r-bloggers.com/2016/02/functions-exercises/>

Useful Websites

- <https://www.datacamp.com/>
- <https://www.tutorialandexample.com/>
- <https://swcarpentry.github.io/r-novice-inflammation/>
- <https://www.scribbr.com/category/statistics/>