1 Exercise 1

1.1 Unordered list

Units that I taught recently

- STAT1371
- STAT2170/6180
- STAT1378
- STAT7111/8111

1.2 Ordered list

My Top 10 list of Final Fantasy Game

1. FFIV
2. FFVI
3. FFX
4. FFVII
5. FFXII
6. FFV
7. FFIV
8. FFXIII
9. FFXV
10. FFVIII

2 Exercise 2

```
> ans <- 1/(-tan(acos(sqrt(2)/2)-4*atan(1/5)))
```

$$\left[-\tan\left(\arccos\left(\frac{\sqrt{2}}{2}\right)-4\arctan\left(\frac{1}{5}\right)\right)\right]^{-1}=238.999999999994.$$

3 Exercise 3

$$\frac{-b \pm \sqrt{b^2 - 4ab}}{2a}$$

$$e^{i\pi} + 1 = 0$$

$$\frac{1}{\sigma\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-\frac{1}{2}(x-\mu)^2/\sigma^2} \, \mathrm{d}x = 1$$

$$\int_1^{\sqrt[3]{3}} z^2 \, \mathrm{d}z \times \cos\left(\frac{3\pi}{9}\right) = \log\left(\sqrt[3]{e}\right)$$

4 Exercise 4

$\frac{1}{2}$.

5 Exercise 5

Let $\mu_t = \hat{y}_t = l_{t-1} + b_{t-1}$ denote the one-step forecast of y_t assuming we know the values of all parameters. Also let $\epsilon_t = y_t - \mu_t$ denote the one-step forecast error at time t. Then

$$y_t = l_{t-1} + b_{t-1} + \epsilon_t, \tag{1}$$

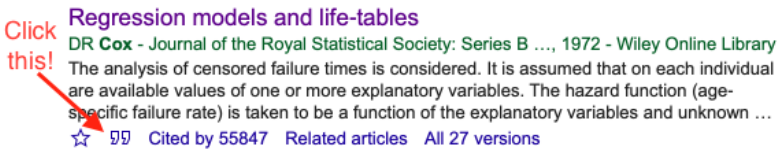
and so we can write

$$l_t = l_{t-1} + b_{t-1} + \alpha\epsilon_t \tag{2}$$

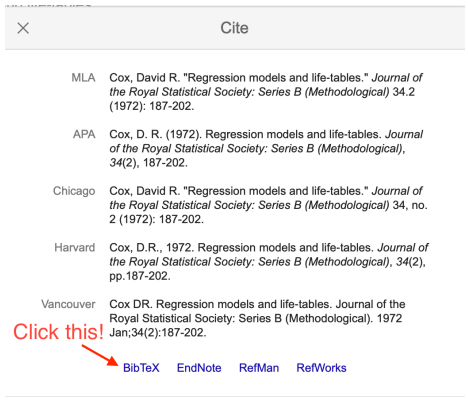
$$b_t = b_{t-1} + \beta^* (l_t - l_{t-1} - b_{t-1}) = b_{t-1} + \alpha\beta^*\epsilon_t. \tag{3}$$

We simplify the last expression by setting $\beta = \alpha\beta^*$. The three equations above constitute a state space model underlying Holt's method. The model is fully specified once we state the distribution of the error term ϵ_t. Usually we assume that these are independent and identically distributed, following a Gaussian distribution with mean 0 and variance σ^2, which we write as $\epsilon_t \sim NID(0, \sigma^2)$.

6 Exercise 6



a)



b)

Figure 1: This is the second step in the instructions to extract a BibTeX reference from Google Scholar.

7 Exercise 7

Mark for Part 1 (/15)	13
Mark for Part 2 (/15)	12
Mark for LaTeX Checklist (/5)	5
Total (/35)	30

		$\alpha = 0.5$		$\alpha = 0.8$	
	h	γ_1	γ_2	γ_1	γ_2
$\sigma = 0.05$	1	0.15	0.04	0.15	0.04
	5	0.21	0.08	0.28	0.14
	10	0.27	0.13	0.39	0.28
$\sigma = 0.10$	1	0.30	0.16	0.30	0.16
	5	0.43	0.33	0.58	0.60
	10	0.55	0.55	0.81	1.19

Table 1: Example 2

8 Exercise 8

Once you have these articles, write a nonsense paragraph that uses `\cite` to reference each of them, and include a bibliography at the end of your document. In this case, I've reused the `bib` file from Topic 9 and cited an article [3], a book [1], and a package [2]. The list of references is located at the end of this worksheet. Notice that you may have to step in adjust the Google Scholar output so that the information are presented consistently, such as the author

names use only first initials and that the journal names and article titles (eg. Fourier-Kochin) are capitalised correctly.

References

[1] Mary L. Boas. *Mathematical methods in the physical sciences*. John Wiley & Sons, 2006.

[2] T. Fung, A. Alwan, J. Wishart, and A. Huang. *mpcmp: Mean-parametrized Conway-Maxwell Poisson Regression*, 2020. R package version 0.3.6.9000.

[3] C. J. Lustri and M. A. Porter. Nanoptera in a period-2 Toda chain. *SIAM Journal on Applied Dynamical Systems*, 17(2):1182–1212, 2018.

c)

```
@article{cox1972regression,
  title={Regression models and life-tables},
  author={Cox, David R},
  journal={Journal of the Royal Statistical Society: Series B (Methodological)},
  volume={34},
  number={2},
  pages={187--202},
  year={1972},
  publisher={Wiley Online Library}
}
```

Now Google Scholar has produced the BibTeX details for you.

You will normally need to edit it slightly for consistency across all references.

Figure 2: This is the third and final step in the instructions to extract a BibTeX reference from Google Scholar. It follows from the second step, given in Figure 1.