Corrections to Numerical Solutions of Differential Equations Notes

1/. Page 7: At the bottom of the page. $\int_0^x g(t)\,dt \overset{\leq}{=} \int_0^x \lambda\,dt = \lambda x$

2/. Page 12: Do NOT confuse the f in $\delta_h(f) = \frac{f(x+h) - f(x-h)}{2h}$ with the f in $y'(x) = f(x, y)$. ↳ Central Difference

3/. Page 13: $Y(x_{n+1}) = y(x_n) + \int_{x_n}^{x_{n+1}} f(x, y(x))\,dx$ The plus sign is missing in the notes.

4/. Page 19: $x_{n+1} = x_n + h$

$y_{n+1} = y_n + \frac{h}{2}\left[f(x_n, y_n) + f(x_n + h, y_n + hf(x_n, y_n))\right]$

The $\underset{=}{h}$ outside the [ ] brackets is missing in the notes. (Heun formula).

5/. Page 22: i) In the Predator-Prey Model, y_1 is the prey population and y_2 is the predator population.

ii) Competitive Exclusion: $\frac{dy_1}{dx} = Ay_1 - By_1^2 - Cy_1y_2 \overset{\leq}{=}$.

6/. Page 24: Both y_{i-1} and y_{i-1} should have plus signs, in the left hand side.

i) $\frac{y_{i+1} - 2y_i + y_{i-1}}{h^2} = p_i \frac{y_{i+1} - y_{i-1}}{2h} + q_i y_i + r_i + O(h^3)$ and

ii) $\frac{y_{i+1} - 2y_i + y_{i-1}}{h^2} = p_i \frac{y_{i+1} - y_{i-1}}{2h} + q_i y_i + r_i$ Plus signs before y_{i-1} and y_{i-1} in the L.H.S.

7/. Page 25: $\frac{y_{i+1} - 2y_i + y_{i-1}}{h^2} = f\left(x_i, y_i, \frac{y_{i+1} - y_{i-1}}{2h}\right)$.

Again, in the left hand side, y_{i-1} carries a plus sign.