

MA108S Lecture 1

Exercise Answers

1 Linear ODEs

- i. Non-linear, order 4
- ii. Linear, order 2
- iii. Non-linear, order 3

2 Separable ODEs

- i. Separable, $\cos y = \frac{2.1}{x^2} + C$
- ii. Separable, $y * (\ln y - 1) = \frac{x}{2} - \frac{\sin 2\pi x}{2\pi} + C$
- iii. Separable, $y = -\ln(\frac{e^t}{26}(5 \cos 5t - \sin 5t) + C)$
- iv. Not separable

3 Closed ODEs

- i. Closed, $y(\sin x - 1) + x^2 e^y = C$
- ii. Closed, $\frac{x^4}{4} + \frac{x^2 y^2}{2} = C$
- iii. Closed, $\arctan(\frac{y}{x}) = C$
- iv. Not closed