Sheet 8

Submission of the solutions: 21.12.2021, 14:00

This exercise sheet is concerned with the topics

- Ordinary differential equations (ODEs)

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1. Solve the following ODEs

a) $(1-x^2)u'(x) - xu(x) = 0$;

b) $u'(x) = \frac{1+u(x)}{1+x}$;

c) $x\cos(xu)u' + (u\cos(xu) + 2x) = 0$.

2. Find the solutions for the ODEs

a) $u' = \frac{x^2-u}{x}$;

b) $(x^2-u^2)u' - 2xu = 0$,

by computing an integrating factor.

3. Find the solutions to the following linear ODEs with initial conditions $u(0) = 0$, $u'(0) = 1$

a) $u'' + u' - 6u = 0$;

b) $u'' - 4u' + 5u = 0$.