

II Rok, Wydział Górnictwa i Geoinżynierii AGH
Jastrzębie Zdrój
Zadania z MATEMATYKI
ZESTAW 3

Równania różniczkowe zwyczajne pierwszego rzędu

1. $y' = x^2 + x + 1$
2. $y' = \operatorname{tg} x + x^2 - 1$
3. $y' = 3y + 5$
4. $y' = 4y^2 - 9$
5. $y' = 3y^2 + 6$
6. $y' = (2x + 3)y$
7. $y' = x^2(2y - 3)$
8. $y' = \frac{x}{(1-x)y}$
9. $y' = \frac{x^3 y}{1-x^2}$
10. $y' = 2xy - xy^2$
11. $y' = y^4 e^{2x}$
12. $\begin{cases} y' = 1 - y^2 \\ y(0) = 0 \end{cases}$
13. $y' = \frac{y}{x} + \frac{x}{y}$
14. $y' = \frac{y}{x} - \left(\frac{y}{x}\right)^2$
15. $\begin{cases} y' = 1 + \frac{y}{x} + \left(\frac{y}{x}\right)^2 \\ y(1) = 1 \end{cases}$
16. $y' = \frac{2x+3y}{x}$
17. $y' = \frac{1}{\sin 2\frac{y}{x}} + \frac{y}{x}$
18. $\begin{cases} y' = \frac{y+x}{y-x} \\ y(-1) = 1 \end{cases}$
19. $\begin{cases} y' = \frac{y^3+x^2y}{x^3} \\ y(1) = -1 \end{cases}$
20. $y' = \frac{1}{x}y + x^2 \sin 5x$
21. $y' = xy + x^3$

$$22. \begin{cases} y' = \frac{3}{x}y + x \\ y(1) = 2 \end{cases}$$

$$23. \begin{cases} y' = 2y + (e^x - x) \\ y(0) = \frac{1}{4} \end{cases}$$

$$24. y' = -(\sin x)y + \sin x$$

$$25. y' = (x + 2)y + x + 2$$

$$26. y' = -2y + e^{3x}$$

$$27. \begin{cases} y' = -\frac{1}{x}y + \sqrt{x} \\ y(1) = 2 \end{cases}$$

Równania różniczkowe zwyczajne drugiego rzędu

1. $y'' + 3y' - 4y = 0$
2. $y'' - 10y' + 25y = 0$
3. $y'' - y = 0$
4. $y'' + y' = 0$
5. $y'' = 5x + 1$
6. $y'' + y' = 5x + 1$
7. $y'' + y' - 2y = 5x + 1$
8. $y'' - 2y' + y = 1$
9. $y'' + 2y' - 3y = x^2$
10. $y'' + 6y' + 9y = 3x^2 + 4$
11. $y'' + 4y' = e^x$
12. $y'' - 4y' = 2e^{4x}$
13. $y'' - 4y' + 4y = xe^{2x}$
14. $\begin{cases} y'' - 6y' + 9y = e^{2x} \\ y(0) = 0 \\ y'(0) = 1 \end{cases}$
15. $\begin{cases} y'' - 6y' + 9y = 2e^{3x} \\ y(1) = 0 \\ y'(1) = -1 \end{cases}$
16. $\begin{cases} y'' + 5y' + 6y = e^{-2x} \\ y(0) = 0 \\ y'(0) = 0 \end{cases}$
17. $y'' - y' = \frac{e^x}{1+e^x}$
18. $y'' - y = \frac{1}{1+e^x}$
19. $y'' + 4y' + 4y = e^{-2x} \ln x$
20. $\begin{cases} y'' + 3y' + 2y = \sqrt{1-e^x} \\ y(0) = 1 \\ y'(0) = 0 \end{cases}$