

## Lineárne a kvázilineárne PDR prvého rádu

Nájdite všeobecné riešenie nasledovných rovníc (v príkladoch 16-18 je hľadaná funkcia  $u = u(x, y, z)$ , inde  $z = z(x, y)$ ):

1.  $y \frac{\partial z}{\partial x} + x \frac{\partial z}{\partial y} = x - y$
2.  $e^x \frac{\partial z}{\partial x} + y^2 \frac{\partial z}{\partial y} = ye^x$
3.  $2x \frac{\partial z}{\partial x} + (y - x) \frac{\partial z}{\partial y} - x^2 = 0$
4.  $xy \frac{\partial z}{\partial x} - x^2 \frac{\partial z}{\partial y} = yz$
5.  $x \frac{\partial z}{\partial x} + 2y \frac{\partial z}{\partial y} = x^2y + z$
6.  $(x^2 + y^2) \frac{\partial z}{\partial x} + 2xy \frac{\partial z}{\partial y} + z^2 = 0$
7.  $2y^4 \frac{\partial z}{\partial x} - xy \frac{\partial z}{\partial y} = x\sqrt{z^2 + 1}$
8.  $x^2z \frac{\partial z}{\partial x} + y^2z \frac{\partial z}{\partial y} = x + y$
9.  $yz \frac{\partial z}{\partial x} - xz \frac{\partial z}{\partial y} = e^z$
10.  $(z - y)^2 \frac{\partial z}{\partial x} + xz \frac{\partial z}{\partial y} = xy$
11.  $xy \frac{\partial z}{\partial x} + (x - 2z) \frac{\partial z}{\partial y} = yz$
12.  $y \frac{\partial z}{\partial x} + z \frac{\partial z}{\partial y} = \frac{y}{x}$
13.  $\sin^2 x \frac{\partial z}{\partial x} + \operatorname{tg} z \frac{\partial z}{\partial y} = \cos^2 z$
14.  $(x + z) \frac{\partial z}{\partial x} + (y + z) \frac{\partial z}{\partial y} = x + y$
15.  $(xz + y) \frac{\partial z}{\partial x} + (x + yz) \frac{\partial z}{\partial y} = 1 - z^2$
16.  $(y + z) \frac{\partial u}{\partial x} + (z + x) \frac{\partial u}{\partial y} + (x + y) \frac{\partial u}{\partial z} = u$
17.  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + (z + u) \frac{\partial u}{\partial z} = xy$
18.  $(u - x) \frac{\partial u}{\partial x} + (u - y) \frac{\partial u}{\partial y} - z \frac{\partial u}{\partial z} = x + y$
19.  $y^2 \frac{\partial z}{\partial x} + xy \frac{\partial z}{\partial y} = x$
20.  $x \frac{\partial z}{\partial x} - 2y \frac{\partial z}{\partial y} = x^2 + y^2$

21.  $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = z - xy$
22.  $\operatorname{tg} x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = z$
23.  $x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y} = z^2(x - 3y)$
24.  $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = z - x^2 - y^2$
25.  $yz \frac{\partial z}{\partial x} + xz \frac{\partial z}{\partial y} = xy$
26.  $z \frac{\partial z}{\partial x} - xy \frac{\partial z}{\partial y} = 2xz$
27.  $z \frac{\partial z}{\partial x} + (z^2 - x^2) \frac{\partial z}{\partial y} + x = 0$
28.  $(y - z) \frac{\partial z}{\partial x} + (z - x) \frac{\partial z}{\partial y} = x - y$
29.  $x \frac{\partial z}{\partial x} + (xz + y) \frac{\partial z}{\partial y} = z$
30.  $y^2 \frac{\partial z}{\partial x} + yz \frac{\partial z}{\partial y} + z^2 = 0$
31.  $x \frac{\partial z}{\partial x} + z \frac{\partial z}{\partial y} = y$
32.  $(y + 2z^2) \frac{\partial z}{\partial x} - 2x^2 z \frac{\partial z}{\partial y} = x^2$
33.  $(x - z) \frac{\partial z}{\partial x} + (y - z) \frac{\partial z}{\partial y} = 2z$
34.  $xy^3 \frac{\partial z}{\partial x} + x^2 z^2 \frac{\partial z}{\partial y} = y^3 z$
35.  $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 2xy$