7. $2x^2 + Cy^2 = 1.$

$$4x\,dx + 2Cy\,dy = 0$$
$$4xy\,dx + 2Cy^2\,dy = 0$$
$$4xy\,dx + (1-2x^2)\,dy = 0$$
$$\boxed{y' = -\frac{4xy}{1-2x^2}}$$

37. $y' = x^2 + y^2 - 1.$

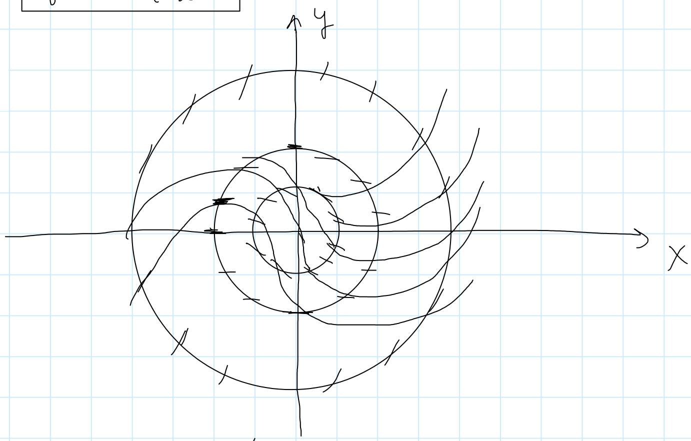
$y' = -1 \Rightarrow x^2+y^2=0$

$y' = -0{,}75 \Rightarrow x^2+y^2=0{,}25$

$y' = 0 \Rightarrow x^2+y^2=1$

$y' = 3 \Rightarrow x^2+y^2=4$

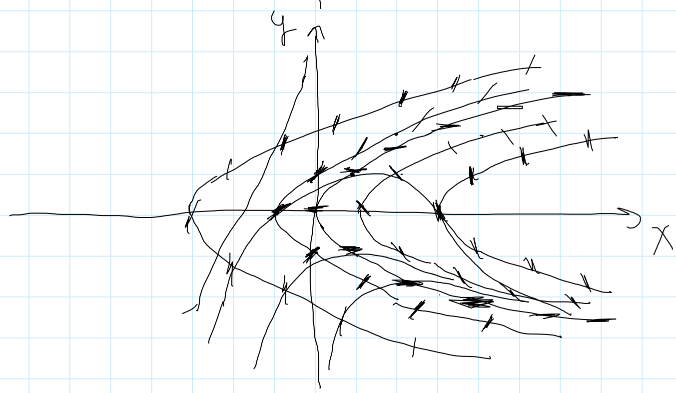
$y' = 8 \Rightarrow x+y^2=9$



$y' = y^2 - x$

$y'' = 2yy' - 1$

в т.м. $y'=0 \Rightarrow y''=-1$ $\cap$



4. $y'\cos x + y(1+y)\sin x = 0.$

$$\frac{dy}{y(1+y)} = -\operatorname{tg} x\,dx$$

$$\int\frac{dy}{y(1+y)} = \int dy\left(\frac{1}{y} - \frac{1}{1+y}\right) = \ln y - \ln(1+y) = -\int \operatorname{tg} x\,dx = +\ln\cos x$$

$$C + \ln\frac{y}{1+y} = +\ln\cos x \Rightarrow \boxed{\frac{y}{1+y} = \cos x \cdot C}$$

17. $(1+\cos x)yy' = (1+y^2)\sin x.$

$$\frac{y\,dy}{1+y^2} = \frac{\sin x\,dx}{1+\cos x} \Rightarrow \frac{1}{2}\int\frac{dy^2}{1+y^2} = \frac{1}{2}\ln(1+y^2) = -\int\frac{d\cos x}{1+\cos x} = -\ln(1+\cos x) + C$$

$$\boxed{\frac{1}{\sqrt{1+y^2}} = (1+\cos x)\cdot C}$$

31. $3x(x+1)y' = (x+2)y,\ y(1) = -1.$

$$3\frac{dy}{y} = \frac{x+2}{x(x+1)}dx = 2\cdot\frac{2(x+1)-x}{2(x+1)x}dx = \left(\frac{2}{x} - \frac{1}{x+1}\right)dx$$

$$3\ln y = 2\ln x - \ln(x+1) + C \Rightarrow y^3 = C\cdot\frac{x^2}{x+1} \Rightarrow C=-2 \Rightarrow \boxed{y^3 = -\frac{2x^2}{x+1}}$$

43. $y = C\sin x - 2.$

43. $y = C\sin x - 2.$

$$y' = C\cos x = \frac{y+2}{\sin x}\cos x = (y+2)\,\mathrm{ctg}\,x \leftrightarrow -\frac{1}{y'} = (y+2)\,\mathrm{ctg}\,x$$

$$-\mathrm{tg}\,x\,dx = (y+2)\,dy$$

$$\boxed{+\ln\cos x = \frac{y^2}{2} + 2y + C}$$

59. $x\,dy = \left(y + \sqrt{x^2+y^2}\right)dx,\ x \geqslant 0.$

$$\{y = xz \Rightarrow dy = z\,dx + x\,dz\}$$

$$xz\,dx + x^2dz = (xz + \sqrt{x^2+x^2z^2})\,dx$$

$$z\,dx + x\,dz = (z + \sqrt{1+z^2})\,dx$$

$$x\,dz = \sqrt{1+z^2}\,dx$$

$$\frac{dz}{\sqrt{1+z^2}} = \frac{dx}{x} \Rightarrow \ln\left(z + \sqrt{1+z^2}\right) = \ln x + C \Rightarrow z + \sqrt{1+z^2} = Cx$$

$$\boxed{\frac{y}{x} + \sqrt{1+\frac{y^2}{x^2}} = Cx}$$

72. $(x+y+1)dx + (x-y+3)dy = 0.$

$$\left.\begin{matrix} x+y+1=0 \\ x-y+3=0 \end{matrix}\right\} \begin{matrix} x=-2 \\ y=1 \end{matrix} \Rightarrow \left.\begin{matrix} t = x+2 \\ p = y-1 \end{matrix}\right\} \begin{matrix} (t-2+p+1+1)dt + (t-2-p-1+3)dp = 0 \\ (t+p)dt + (t-p)dp = 0 \end{matrix}$$

$$t\,dt + p\,dt + t\,dp - p\,dp = 0$$

$$d\frac{t^2}{2} + d(pt) - d\frac{p^2}{2} = 0$$

$$\frac{t^2}{2} + pt - \frac{p^2}{2} = C \Rightarrow \boxed{\frac{(x+2)^2}{2} + (y-1)(x+2) - \frac{(y-1)^2}{2} = C}$$

27. $4y' + 12x^2y = 3x^2.$

$$4y' = 3x^2(1-4y)$$

$$\int\frac{4\,dy}{1-4y} = \int 3x^2dx \Rightarrow -\ln(1-4y) = x^3 + C \Rightarrow \boxed{1-4y = Ce^{-x^3}}$$

35. $(1+y^2)dx + (2xy-1)dy = 0.$

$$\frac{\partial(1+y^2)}{\partial y} = 2y = \frac{\partial(2xy-1)}{\partial x} \Rightarrow \exists F(x,y) \text{ т.ч. } dF = (1+y^2)dx + (2xy-1)dy$$

$$\begin{cases} \frac{\partial F}{\partial x} = 1+y^2 \\ \frac{\partial F}{\partial y} = 2xy-1 \end{cases} \Rightarrow F(x,y) = (1+y^2)x + f(y) \Rightarrow \frac{\partial F}{\partial y} = f'(y) + 2xy = 2xy - 1 \Rightarrow$$

$$\Rightarrow f(y) = -y + C$$

$$\boxed{F(x,y) = (1+y^2)x - y = \mathrm{const}}$$

45. $x^2y' + y = 4,\ y(-1) = 5.$

$$z = y-4 \Rightarrow x^2z' + z = 0 \Rightarrow \frac{x^2dz}{dx} = -z \Rightarrow -\frac{dz}{z} = \frac{dx}{x^2} \Rightarrow -\ln z = -\frac{1}{x} + C \Rightarrow$$

$$\Rightarrow z = Ce^{\frac{1}{x}} \Rightarrow y = 4 + Ce^{1/x} \Rightarrow \left\{\begin{matrix} 5 = 4 + C/e \\ C = e \end{matrix}\right\} \Rightarrow \boxed{y = 4 + e^{1+\frac{1}{x}}}$$

64. $y' \cos x + y \sin x + 3y^2 \cos x = 0.$

1) $y=0$ – решение//

2) $y \neq 0$

$$\left.\begin{aligned} & y' + y\,tg x + 3y^2 = 0 \\ & z = 1/y \\ & y' = -\frac{1}{z^2} z' \end{aligned}\right\} \quad -\frac{1}{z^2} z' + \frac{1}{z} tg x + 3\frac{1}{z^2} = 0$$

$$-z' + z\,tg x + 3 = 0$$

Решим $z' = z\,tg x$

$$\frac{dz}{z} = tg x\,dx \Rightarrow \ln z = -\ln\cos x + C$$

$$z = C(x)/\cos x$$

Тогда: $z' = \dfrac{C'(x)}{\cos x} + \dfrac{C(x)\sin x}{\cos^2 x} \Rightarrow \dfrac{c'}{\cos x} + \dfrac{C\sin x}{\cos^2 x} - \dfrac{c\sin x}{\cos^2 x} - 3 = 0$

$$C' = 3\cos x \Rightarrow C(x) = 3\sin x + B \Rightarrow \boxed{\frac{1}{y} = \frac{3\sin x + B}{\cos x} = 3tg x + \frac{B}{\cos x}}$$

84. $4y' = y^2 + \dfrac{4}{x^2}\,.$

Пусть $y = \dfrac{A}{x} \Rightarrow -\dfrac{4A}{x^2} = \dfrac{A^2}{x^2} + \dfrac{4}{x^2} \Rightarrow A^2 + 4A + 4 = 0 \Rightarrow A = -2 \Rightarrow y = -\dfrac{2}{x}$ – частное реш.

Тогда $\left.\begin{aligned} & y = z - \frac{2}{x} \\ & y' = z' + \frac{2}{x^2} \end{aligned}\right\} \quad 4z' + \dfrac{8}{x^2} = z^2 - \dfrac{4z}{x} + \dfrac{4}{x^2} + \dfrac{4}{x^2} \Rightarrow$

$\Rightarrow 4z' = z^2 - \dfrac{4z}{x}$, $\boxed{z = 0 \text{ – решение}}$

Замена $t = \dfrac{1}{z}$, $z \neq 0$: $-\dfrac{4}{t^2} t' = \dfrac{1}{t^2} - \dfrac{4}{tx} \Rightarrow +4t' = \dfrac{4t}{x} - 1$

Решим $4t' = \dfrac{4t}{x} \Rightarrow \dfrac{dt}{t} = \dfrac{dx}{x} \Rightarrow t = Cx \;\Big|\; t = F(x)x \rightsquigarrow t' = F'(x)x + F(x)$

Тогда $4F'(x)x + 4F(x) = 4F(x) - 1 \Rightarrow F'(x) = -\dfrac{1}{4x} \Rightarrow F(x) = -\dfrac{1}{4}\ln x + C$

$$\frac{1}{z} = \left(-\frac{1}{4}\ln x + C\right)x \Rightarrow \boxed{y = \frac{1}{x\left(-\frac{1}{4}\ln x + C\right)} - \frac{2}{x} \;\Big|\; y = -\frac{2}{x}}$$

94. $x^2y' - 5xy + x^2y^2 + 8 = 0.$???

$$y = \frac{A}{x} \Rightarrow x^2\left(\frac{-A}{x^2}\right) - \frac{5Ax}{x} + x^2\frac{A^2}{x^2} + 8 = 0$$

$$-A - 5A + A^2 + 8 = 0$$

$$A^2 - 6A + 8 = 0$$

$$\left[\begin{aligned} & A = 4 \\ & A = 2 \end{aligned}\right.$$

$$\left.\begin{aligned} & y = z + \frac{2}{x} \\ & y' = z' - \frac{2}{x^2} \end{aligned}\right\} \quad x^2\left(z' - \frac{2}{x^2}\right) - 5x\left(z + \frac{2}{x}\right) + z^2 + \frac{4}{x^2} + \frac{2z}{x} + 8 = 0$$

$$z'x^2 - 5xz + z^2 + \frac{2z}{x} = 0 \quad \Big| \; z = 0 \text{ – решение}$$

$$t = \frac{1}{z} \Rightarrow -\frac{1}{t^2}t'x^2 - \frac{5x}{t} + \frac{1}{t^2} + \frac{2}{xt} = 0$$

$$x^2t' + 5xt - 1 - \frac{2t}{x} = 0$$

Решим $x^2t' = \left(\dfrac{2}{x} - 5x\right)t$

$$\frac{dt}{t} = \frac{2 - 5x^2}{x^3}dx$$

$$\ln t = -\frac{1}{x^2} - 5\ln x + C$$

$$z = Ce^{\frac{1}{x^2} + 5\ln x} \Rightarrow \left[\begin{aligned} & y = \frac{2}{x} \\ & y = Ce^{\frac{1}{x^2} + 5\ln x} + \frac{2}{x} \end{aligned}\right.$$

18. $\left(1+\frac{2x}{y^3}\right)dx+\left(\frac{1}{y^2}-\frac{3x^2}{y^4}\right)dy=0.$

$$\frac{\partial\left(1+\frac{2x}{y^3}\right)}{\partial y} = -\frac{6x}{y^4} = \frac{\partial\left(\frac{1}{y^2}-\frac{3x^2}{y^4}\right)}{\partial x}$$

Тогда
$$\begin{cases} \frac{\partial F}{\partial x} = 1+\frac{2x}{y^3} \Rightarrow F(x,y) = x + \frac{x^2}{y^3} + f(y) \Rightarrow \\ \frac{\partial F}{\partial y} = \frac{1}{y^2} - \frac{3x^2}{y^4} \qquad \Rightarrow \frac{\partial F(x,y)}{\partial y} = \cancel{-\frac{3x^2}{y^4}} + f'(y) = \frac{1}{y^2} \cancel{-\frac{3x^2}{y^4}} \Leftrightarrow \end{cases}$$

$$\Leftrightarrow f(y) = -\frac{1}{y} + C \Rightarrow F(x,y) = x + \frac{x^2}{y^3} - \frac{1}{y} + C \Rightarrow \boxed{x + \frac{x^2}{y^3} - \frac{1}{y} = \text{const}}$$

33. $\left(\frac{1}{x}-y\right)dx=\frac{1}{y}\,dy.$

$$\left\{ d\left(\frac{x}{y}\right) = \frac{dx}{y} - \frac{x\,dy}{y^2} \right\}$$

$$\frac{dx}{x} - y\,dx = \frac{dy}{y}$$

$$\frac{dx}{y} - x\,dx = \frac{x\,dy}{y^2}$$

$$d\left(\frac{x}{y}\right) = d\left(\frac{x^2}{2}\right) \Rightarrow \boxed{\frac{x}{y} = \frac{x^2}{2} + C}$$

59. $x^2yy'+x^3=(x^2+y^2)^2.$

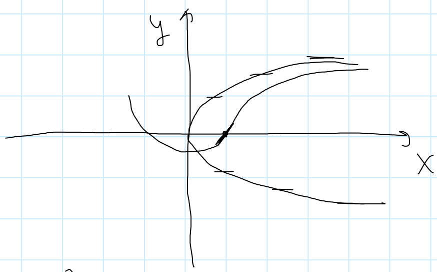
$$t = x^2+y^2 \Rightarrow t' = 2x + 2yy'$$

$$x^2\left(\frac{t'-2x}{2}\right) + x^3 = t^2$$

$$\frac{x^2t'}{2} - \cancel{x^3} + \cancel{x^3} = t^2 \Rightarrow \frac{dt}{2t^2} = \frac{dx}{x^2} \Rightarrow -\frac{1}{2t} = -\frac{1}{x} + C \Rightarrow \frac{1}{t} = \frac{2}{x} + C$$

$$\boxed{\frac{1}{x^2+y^2} = \frac{2}{x} + C}$$

II. 1. $y' = x - y^2$, $y(1) = 0$



1) при условии $y' \geq 0 \Leftrightarrow$

$\Leftrightarrow x - y^2 \geq 0 \Leftrightarrow y^2 \leq x$, т.е.

при $x \geq y^2$ $y(x)$ неубывает.

2) $y'' = 1 - 2yy' = \{y'=0\} = \underline{1}$ — на кривой $y^2 = x$

$y(x)$ имеет максимум.

3) Так как $y(1)=0$, то часть $y(x)$ находится внутри $y^2 \leq x \Rightarrow y(x)$ — возрастает, тогда $y(x)$ не может пересекать $y^2 = x$ в точках при $x > 1$. От противного: если пересекает в (x_0, y_0) $y_0^2 = x_0$, то в этой точке есть max, т.е. в окрестн. при $x \leq x_0$ $y(x)\uparrow$, а при $x \geq x_0$ $y(x)\downarrow \Rightarrow y'(x \geq x_0) \leq 0 \Rightarrow y^2(x \geq x_0) \geq x \geq x_0 = y_0^2 \Rightarrow$
$\Rightarrow y \geq y_0$ — в точке нет максимума — противор.

Тогда $y(x)^2 \leq x$ — распростр. неограниченно вправо //

2. $y = \psi(x)$
$y = \varphi(x)$

$$f(x,y) = \frac{\psi'(x)(y-\varphi(x)) - \varphi'(x)(y-\psi(x))}{\psi(x) - \varphi(x)}$$

при $y = \psi(x)$: $y' = \psi'(x) = \frac{\psi'(x)(\psi(x)-\varphi(x))}{\psi(x)-\varphi(x)} = \psi'(x)$ //

аналог. с $y=\varphi(x)$

4. 1)

	x	$\sin x$
0	0	0
1	1	1
2	0	0
3	0	-1

$- n \geq 4$

2) $\cos x$ и $\sin x$

$\cos x = \sin x \Rightarrow x = \frac{\pi}{4} + \pi k$

струя 0 пересеч,

$\exists$ ур $n \geq 1$

3) $\cos x^2 = 1 - \frac{x^4}{2} + \frac{x^8}{24}$

n	$\cos x^2$
1	1
0	0
0	0
0	-1

$n \geq 4$

4)

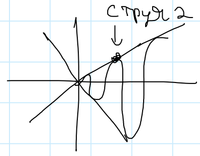
	$\sin x$	1
0	1	1
1	0	0
2	-1	0

$n \geq 3$

5)

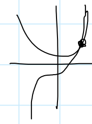
	$x \sin x$	x
0	+	+
1	+	+
	~	~

$n \geq 3$



6) 1 п-дая струи

$n \geq 2$



7)

	xe^x	x
0	0	0
1	1	1
2	0	0
3	1	0

$n \geq 3$

$xe^x = x\left(1 + \frac{x^2}{2} + \frac{x^3}{6}\right) = x + \frac{x^3}{2} + \frac{x^4}{6}$

III. б) $\begin{cases} \dot{x} = x \sin y \\ \dot{y} = 0 \end{cases}$ $\Rightarrow \dot{x} = x \sin y_0 \Rightarrow \ln x = \sin y_0 \, t + \ln x_0 \Rightarrow x = x_0 e^{t \sin y_0}$; $\dot{y}=0 \Rightarrow y = y_0$

$$g^t \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} x e^{t \sin y} \\ y \end{pmatrix}$$

в) $\begin{cases} \dot{x} = x \cos y \\ \dot{y} = 1 \end{cases}$ $\Rightarrow \dot{x} = x \cos(t + y_0) \Rightarrow \ln x = \sin(t+y_0) + C \Rightarrow x = C e^{\sin(t+y_0)} \Rightarrow$; $\dot{y} = 1 \Rightarrow y = t + y_0$

$\Rightarrow x = x_0 e^{\frac{\sin(t+y_0)}{\sin y_0}}$

$$g^t \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} x e^{\frac{\sin(y+t)}{\sin y_0}} \\ t+y \end{pmatrix}$$

г) $\begin{cases} \dot{y} = y - x + 1 \\ \dot{x} = 1 \end{cases}$ $\Rightarrow \dot{y} = y - x_0 - t + 1 \Rightarrow y = Ce^t + t + x_0, \; C = (y_0 - x_0)$; $\dot{x} = 1 \Rightarrow x = x_0 + t$

$$g^t \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} t + x_0 \\ (y_0 - x_0)e^t + t + x_0 \end{pmatrix}$$

IV. **1.** $xy'' + xy'^2 + y' = 0, x \neq 0.$

$y' = z$: $xz' + xz^2 + z = 0$

$t = \frac{1}{z} \Rightarrow z' = -\frac{1}{t^2} t' \Rightarrow x\left(-\frac{1}{t^2}\right)t' + x\frac{1}{t^2} + \frac{1}{t} = 0$

$-xt' + x + t = 0$

$t' = 1 + \frac{t}{x}$

$$t' = 1 + \frac{t}{x}$$

$$\left.\begin{aligned} &t' = 1+\frac{t}{x} \\ &t' = \frac{t}{x} \Rightarrow t = Cx \end{aligned}\right\} \; t' = C'x + C \Rightarrow -x(C'x+C) + x + Cx = 0$$

$$-C'x^2 + x = 0$$

$$C' = \frac{1}{x} \Rightarrow C = \ln x + A$$

$$\frac{1}{z} = (\ln x + A)x \Rightarrow z = \frac{1}{x(\ln x + A)}$$

$$y = \int x(A + \ln x)\,dx = \frac{Ax^2 + x^2\ln x}{2} - \frac{x^2}{4} + C$$

10. $(y^3 + y)y'' - (3y^2 - 1)y'^2 = 0.$

$$y' = t \Rightarrow y'' = t't$$

$$(y^3+y)tt' - (3y^2-1)t^2 = 0$$

$$\frac{t'}{t} = \frac{3y^2-1}{y^3+y} \Rightarrow -\ln y + 2\ln(y^2+1) + C = \ln t \Rightarrow y' = C\left(\frac{(y^2+1)^2}{y}\right) \Rightarrow$$

$$\Rightarrow \frac{yy'}{(y^2+1)^2} = C \Rightarrow y = -\frac{C}{2x^2+2} + A$$

24. $y'' + y'^2 = y'e^y,\ y(0) = 0,\ y'(0) = \frac{1}{2}.$

$$z = y' \Rightarrow y'' = zz'$$

$$zz' + z^2 = ze^y$$

$$z' + z = e^y$$

$$y' = z = Ce^{-y} + \frac{e^y}{2} \Rightarrow \frac{1}{2} = \frac{1}{2} + C \Rightarrow C = 0 \Rightarrow y' = \frac{e^y}{2} \Rightarrow e^{-y}dy = \frac{dx}{2} \Rightarrow$$

$$\Rightarrow -e^{-y} = \frac{x}{2} + C \Rightarrow C = -1 \Rightarrow e^{-y} = \frac{x}{2} - 1$$

40. $yy'' - y'^2 + y^2 \sin x = 0.$

$$z = \frac{y'}{y} \Rightarrow y' = zy \Rightarrow y'' = z'y + zy' = z'y + z^2y = (z'+z^2)y$$

$$\cancel{y^2}(z'+z^2) - z^2\cancel{y^2} + \cancel{y^2}\sin x = 0$$

$$z' + \cancel{z^2} - \cancel{z^2} + \sin x = 0$$

$$\frac{y'}{y} = z = \cos x + C \Rightarrow \ln y = \sin x + C_1x + C_2$$

56. $xyy'' - xy'^2 + y'(y' + y)\sin x = 0,\ y(1) = 1,\ y'(1) = -1.$

$$z = \frac{y'}{y}:\ (z'+z^2)\cancel{y^2}x - xz^2\cancel{y^2} + zy(zy+y)\sin x = 0 \;\Big|\; z(1) = \frac{-1}{1} = -1$$

$$x(z'+z^2) - xz^2 + z(z+1)\sin x = 0$$

$$z' + \frac{\sin x}{x} z(z+1) = 0 \qquad z = -1 - \text{решение}$$

$x(z'+z^2)-xz^2+z(z+1)\sin x=0$

$z'+\frac{\sin x}{x}z(z+1)=0$ $z=-1$ – решение

$z=-1=\frac{y'}{y} \Rightarrow \ln y=-x \Rightarrow y=e^{-x}+C=e^{-x}-e^{-1}$

65. $x^2y''+2x^2yy'+2xy^2-2y=0$,

а) $y(1)=2$, $y'(1)=0$,

$\begin{cases} x=e^t \\ y=(e^t)^{-1}z(t) \end{cases}$ $y'=(z'-z)e^{-2t}$ $xy=z \Rightarrow x=1 \Leftrightarrow t=0$

$y''=(z''-3z'+2z)e^{-3t}$ $2=y(1)=z(0)$

$\Downarrow$

$z''-3z'+2zz'=0$

$\left.\begin{array}{l} p=z' \\ z''=pp' \end{array}\right\}$ $pp'-3p+2zp=0$

$p'-3+2z=0 \Rightarrow dp=(-2z+3)dz \Rightarrow p=-z^2+3z+C=z'$

$y'(1)=0 \Rightarrow (z'(0)-z(0))e^{-0}=0 \Rightarrow z'(0)=z(0) \Rightarrow z_0=-z_0^2+3z_0+C \Rightarrow C=z_0^2-2z_0=0$

$z'=-z^2+3z$

$\frac{dz}{3z-z^2}=dt \Rightarrow \frac{1}{3}\ln\left(\frac{z}{3-z}\right)=t+C \Rightarrow \frac{z}{3-z}=Ce^{3t}$, $C=2$

$\frac{z}{3-z}=2e^{3t} \Rightarrow \frac{z/e^t}{\frac{3}{e^t}-\frac{z}{e^t}}=2e^{3t} \Rightarrow \frac{y}{\frac{3}{x}-y}=2x^3$

$\boxed{xy=2x^3(3-xy)}$

229. Могут ли графики двух решений данного уравнения на плоскости x, y пересекаться в некоторой точке (x_0, y_0)

а) для уравнения $y'=x+y^2$? нет

б) для уравнения $y''=x+y^2$? да

230. Могут ли графики двух решений данного уравнения на плоскости x, y касаться друг друга в некоторой точке (x_0, y_0)

а) для уравнения $y'=x+y^2$? нет

б) для уравнения $y''=x+y^2$? нет

в) для уравнения $y'''=x+y^2$? да

231. Сколько существует решений уравнения $y^{(n)}=x+y^2$, удовлетворяющих одновременно двум условиям: $y(0)=1$, $y'(0)=2$? Рассмотреть отдельно случаи $n=1, 2, 3$.

$n=1$: 1 решение

$n=2$: $y''(0)=0+1=1 \to$ 1 решение

$n=3$: y'' – любое поэтому бесконечно мн-го реш.

234. При каких n уравнение $y^{(n)}=f(x, y, y', \ldots, y^{(n-1)})$ с непрерывно дифференцируемой функцией f может иметь среди своих решений две функции: $y_1=x$, $y_2=\sin x$?

при $n\geq 4$, делал раньше.