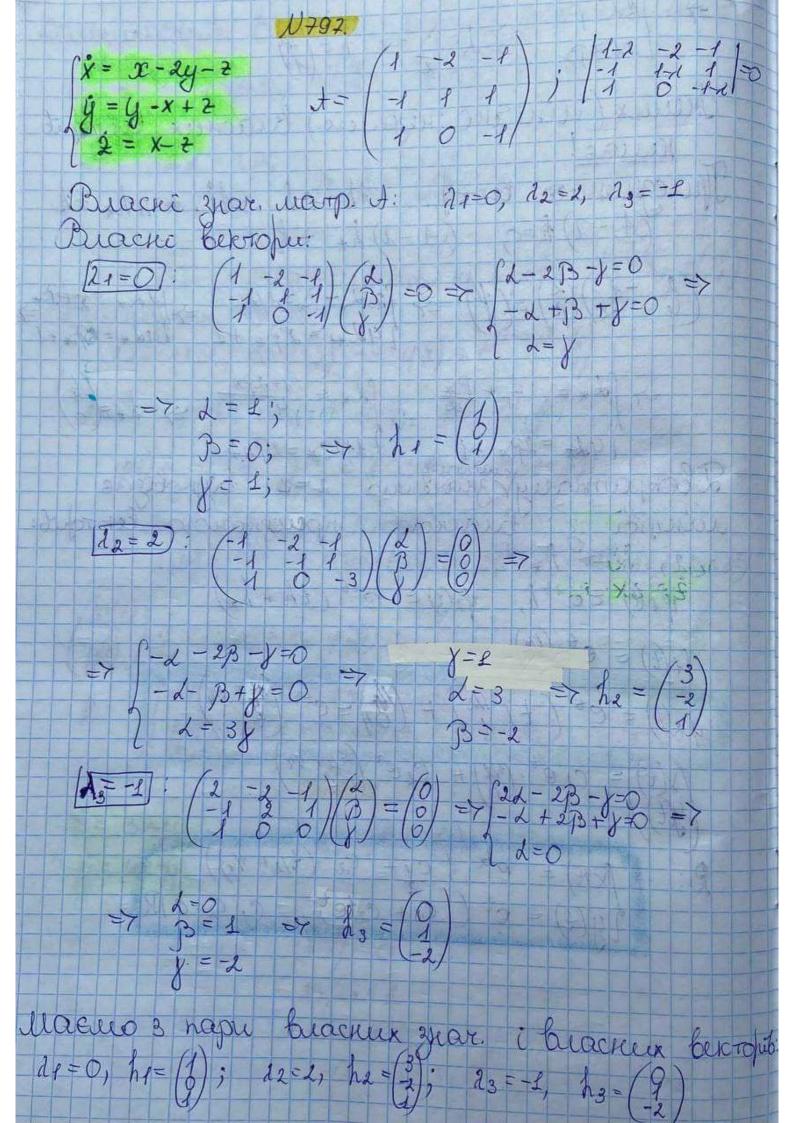
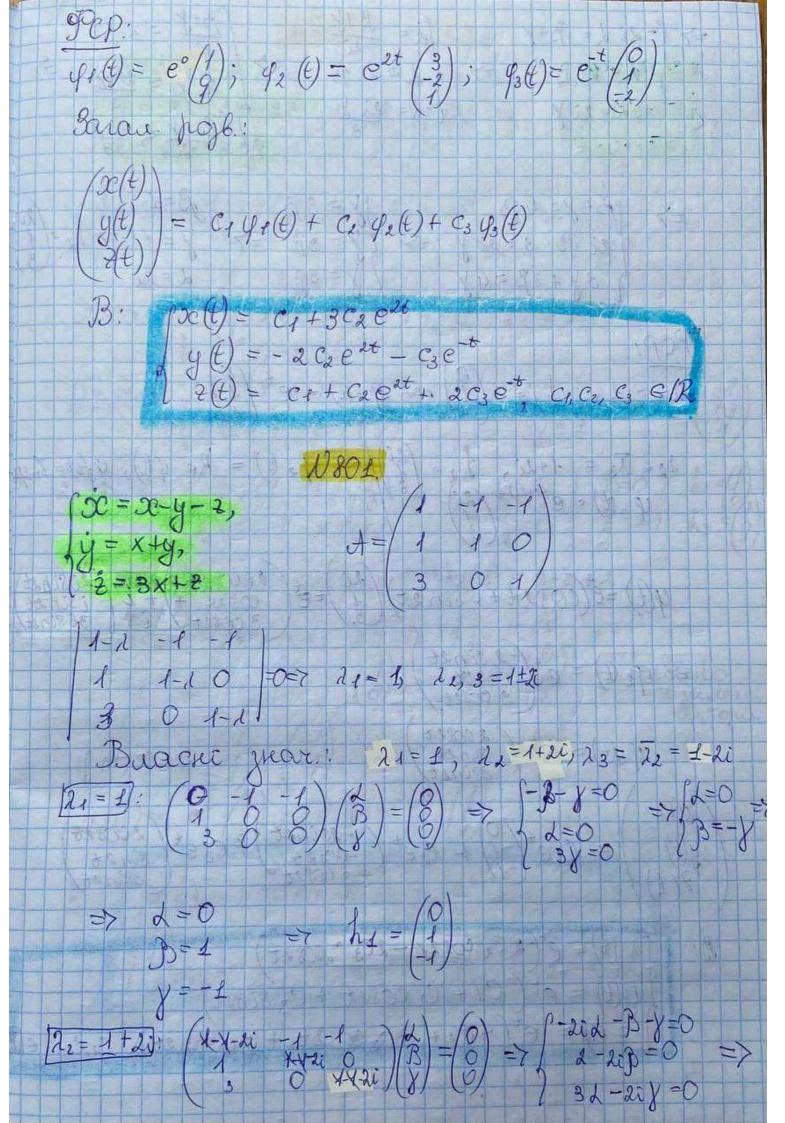
Laurene zabgarna 6. Cnejopensku yrynu TMO-21 Rabeyo Outre 3: zdipruka Pininnoba  $\int \frac{\dot{x}}{\dot{y}} = x - y$   $\frac{1}{\dot{y}} = y - 4x$   $A = \begin{pmatrix} 4 & -1 \\ -4 & 2 \end{pmatrix}$ 2 Myraeuro bracké zhare mamp. A:  $\begin{vmatrix} \lambda - 1 & 1 \\ 4 & \lambda - 1 \end{vmatrix} = (\lambda - 1)(\lambda - 1) - 4 = (\lambda - 2)^2 - 4 = (\lambda - 3)(\lambda + 1) = 0$ 21=37-Brachi znar. mars. A 2. Myraemo Buacke Cermojer mampues A:  $A = \begin{pmatrix} 1 & -1 \\ -4 & 1 \end{pmatrix} \qquad A = \lambda I = \begin{pmatrix} 2 - \lambda & -1 \\ -4 & 1 - \lambda \end{pmatrix}$ => (-2 -1)(2)(0) => (-42-23=0) =>  $\Rightarrow \int -2\lambda = \beta$   $1-2\lambda = \beta$  3 = -2  $\Rightarrow h_1 = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$ => \langle 2d - B = 0 => \langle 2d = B => \langle B => \langle B = 2 \langle 2 \langl

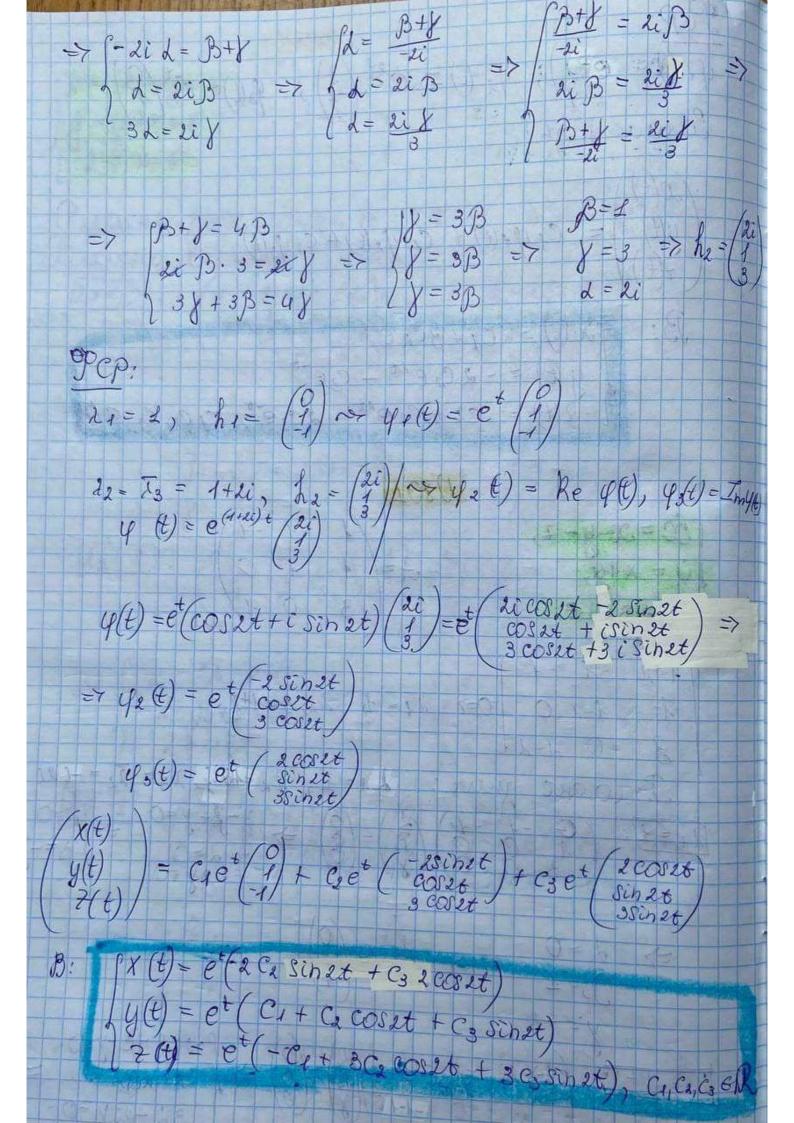
Tapu buacher znarens ma bracher beroropis: 21=3, h=(1); 12=-2, h2=(1) 3. Haxg. PCP ma zanue. zanau. poz6: 2, h -> 4 (t) = eth  $\lambda_1 = 3$ ,  $h_1 = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$   $\sim$   $q_1(t) = e^{3t} \begin{pmatrix} 1 \\ -2 \end{pmatrix} = \begin{pmatrix} e^{3t} \\ -2e^{3t} \end{pmatrix}$  $\lambda_2 = -f$ ,  $\lambda_a = \begin{pmatrix} f \\ 2 \end{pmatrix} \sim \gamma \varphi_2(\xi) = e^{-\xi} \begin{pmatrix} f \\ 2 \end{pmatrix} = \begin{pmatrix} e^{-\xi} \\ 2e^{-\xi} \end{pmatrix}$  $\begin{pmatrix} 2c(t) \\ y(t) \end{pmatrix} = c_1 \begin{pmatrix} e^{st} \\ -2e^{st} \end{pmatrix} + c_2 \begin{pmatrix} e^{-t} \\ 2e^{-t} \end{pmatrix}$ B:  $f_{\infty}(t) = c_1 e^{3t} + c_2 e^{-t} - 301a_1 \cdot p_3 l$ .  $l_y(t) = 2c_1 e^{3t} + 2c_2 e^{-t} - 301a_1 \cdot p_3 l$ . C1, C2 - Sobinsie giteché charté W790.  $A = \begin{pmatrix} 1 & -3 \\ 3 & 1 \end{pmatrix}, \begin{vmatrix} 1-2 & -3 \\ 3 & 1-2 \end{vmatrix} = 0$ x = x - 34 1 y = 3x +y 1-22+22+9-0 12-21+10=0 Q= 1-10=-9 LO 11= L+iB; 120d-iB 11+12=2d=2=7 d=1 21. 12 = 21. II = Rape = Lape = 10 Buachi znavenna: 11=1+3i, 22=1-30  $A = \begin{pmatrix} 1 & -\frac{3}{4} \end{pmatrix}, \quad A - \lambda I = \begin{pmatrix} 1-\lambda & -\frac{3}{4} \end{pmatrix}$ 

Raunnekerente beacherte bekenop gur 21= 1+3i;  $\begin{pmatrix} 1 - (1+3i) & -3 \\ 3 & 1 - (1+3i) \end{pmatrix} = \begin{pmatrix} 3i & -3 \\ 3 & 3i \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix} = 0 \Rightarrow$ => -3i L = 3 B => h, = (i) L = iB => h, = (i) 22 = II = 2-iB-llykamu re mpeda, h2=T1 = (i) Duckojnar DCP: 21= 1+3i, he=(i) ~ 4(e) = e(1+3i)t(i) Ditione pogli if = Rey, 42= Im 9 4(t) = cte 3it/i) = et(cost + i sin3t)(i) 41(t)=ct(cost + isingt) 42(t) = et.i. (cos 3t + isin 3t) = et (-sin 3t + i cos 3t) (x(t)) = C1400 + C2 42(t) B:  $\int \alpha(t) = e^{t} (c_{1}\cos 3t + c_{2}\sin 3t)$   $|y(t)| = e^{t} (-c_{1}\sin 3t + c_{2}\cos 3t), c_{1}, c_{2} \in \mathbb{R}$  $\frac{3-2}{4} - \frac{4}{3-2} = (2-1)^2 = 0$ Beachi zuar: 21= 2= 1 Biacker bekrop! (2 -2)(2)=0=> f21=B

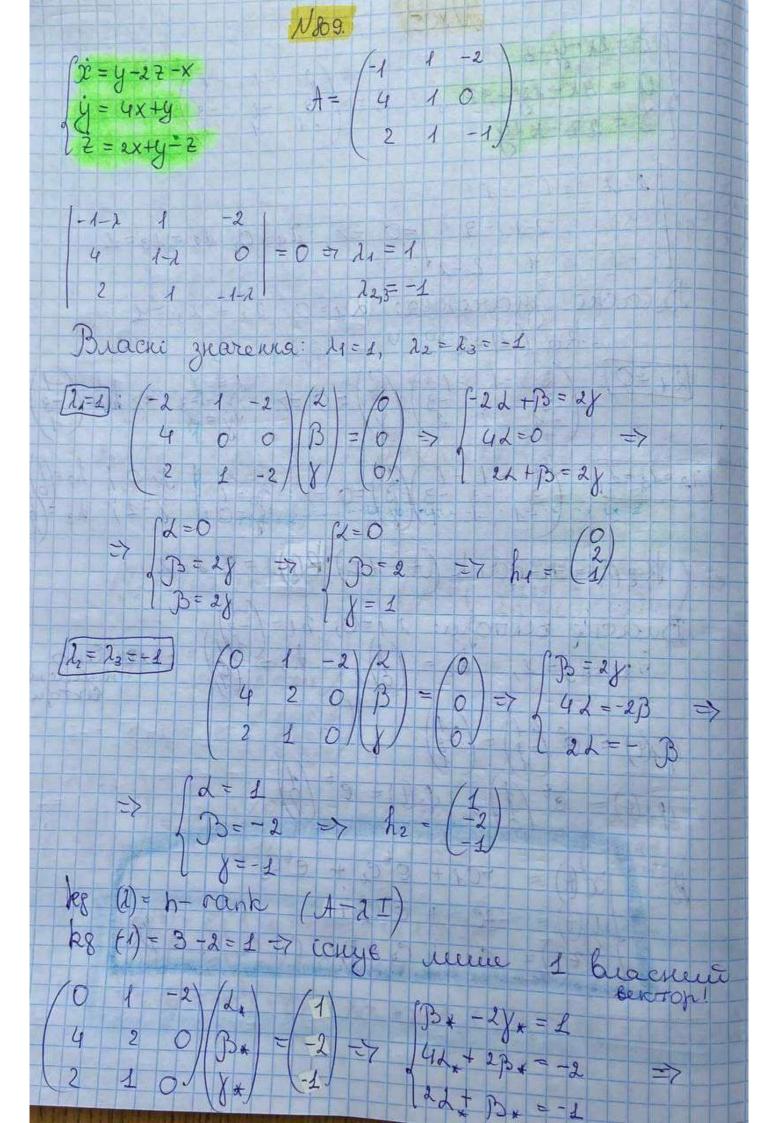
=7 /2L=B =7 L=B =7 h= (1) Juinx (ninitero rezaresa) bracheex betropits Thuegranie berth: 4h = ah, 4h = ah + h (A-1)h=0, (A-2)h = h(2 -2)(2) = (1) = (22 + 3= 1/2 + 224 = 27x+1 The state of the  $u(x(t)) = e^{t} \left( \frac{1/2}{1} \right) - \frac{1/4}{1} = e^{t} \left( \frac{1/4}{1} + \frac{1/4}{1} \right) = e^{t} \left( \frac{1/4}{1} + \frac{1/4}{1} \right)$   $u(x(t)) = e^{t} \left( \frac{1/2}{1} + \frac{1/4}{1} \right) = e^{t} \left( \frac{1/4}{1} + \frac{1/4}{1} \right)$  $\left( \begin{array}{c} \chi(t) \\ y(t) \end{array} \right) = c_1 e^t \left( \begin{array}{c} 4/2 \\ 1 \end{array} \right) + c_2 e^t \left( \begin{array}{c} t/2 + 4/4 \\ t \end{array} \right)$ B:  $f_{X}(t) = e^{t} \left( \frac{c_{1} + c_{2}}{c_{1} + c_{2} + c_{3}} \right)$   $f_{X}(t) = e^{t} \left( \frac{c_{1} + c_{2} + c_{3}}{c_{1} + c_{2} + c_{3}} \right)$ ,  $f_{X}(t) = e^{t} \left( \frac{c_{1} + c_{2} + c_{3}}{c_{1} + c_{2} + c_{3}} \right)$ 

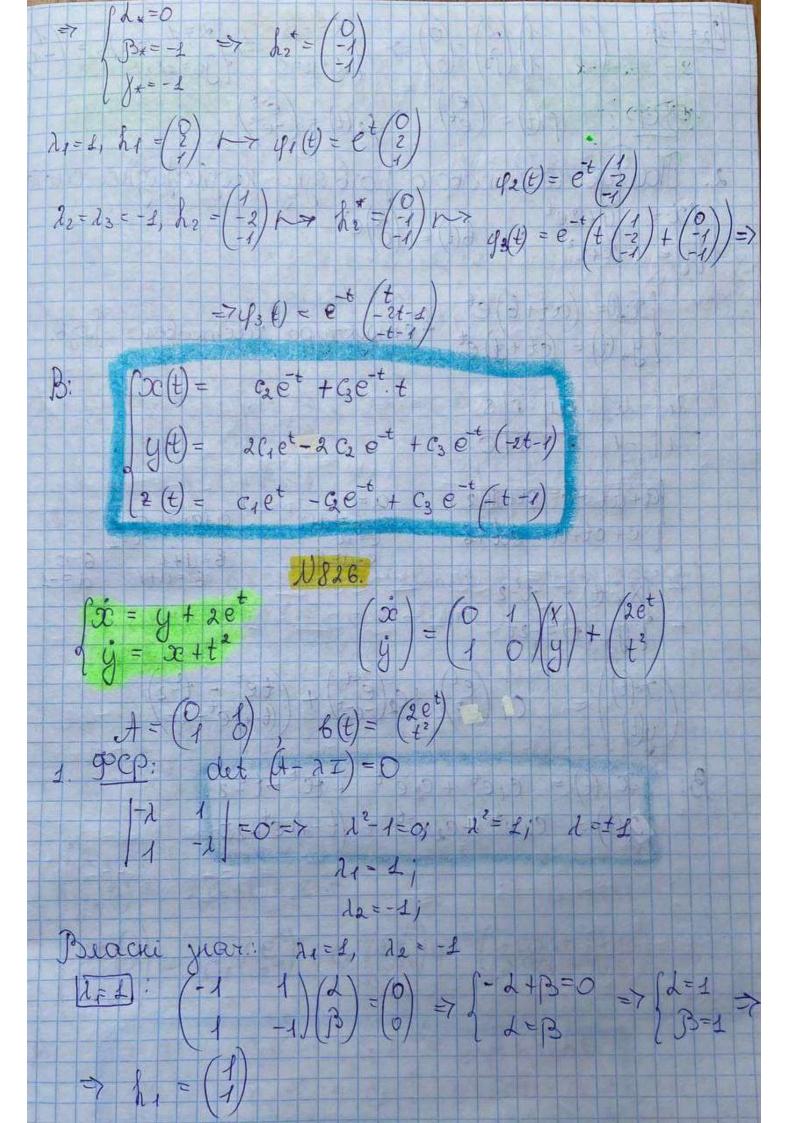






 $\begin{cases} \dot{x} = 2x - y - z \\ \dot{y} = 3x - 2y - 3z \\ \dot{z} = 2z - x + y \end{cases}, \quad \dot{y} = \begin{bmatrix} 2 & -1 & -1 \\ 3 & -2 & -3 \\ -1 & 1 \end{bmatrix}$ Bracke znaverka: 21=0, 22=23=1  $\begin{bmatrix}
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 3 & -2 & -3 \\
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 \end{bmatrix}
 \begin{bmatrix}
 4 & -1 & -1 \\
 \end{bmatrix}
 \begin{bmatrix}
 4 & -1$  $\frac{\lambda_{2} = \lambda_{3} = 1}{\lambda_{2} = \lambda_{3} = 1} = \frac{\lambda_{3} = \lambda_{3}}{\lambda_{3} = \lambda_{3}} = \frac{\lambda_{3} = \lambda_{3}}{\lambda_{3}} = \frac{\lambda_{3}}{\lambda_{3}} = \frac$ R& (A) = n-rank (A-2I); kg(1) = 3-1=2 Bracki bektopu: 1 = 0,  $h_1 = \begin{pmatrix} -1 \\ -3 \end{pmatrix}$  22 = 12 = 12,  $h_2 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ ,  $h_3 = \begin{pmatrix} 1 \\ 9 \end{pmatrix}$  - territorio rescuerc.  $\varphi_{A}(t) = \mathcal{E}\left(\frac{-1}{-3}\right) = \begin{pmatrix} -1\\ -3\\ 1 \end{pmatrix}$  $\varphi_2(t) = e^t(1), \quad \varphi_3(t) = e^t(1)$ B:  $(x(t) = -c_1 + e^t c_2 + e^t c_3)$   $(y(t) = -3c_1 + e^t c_2)$   $(x(t) = -3c_1 +$ 

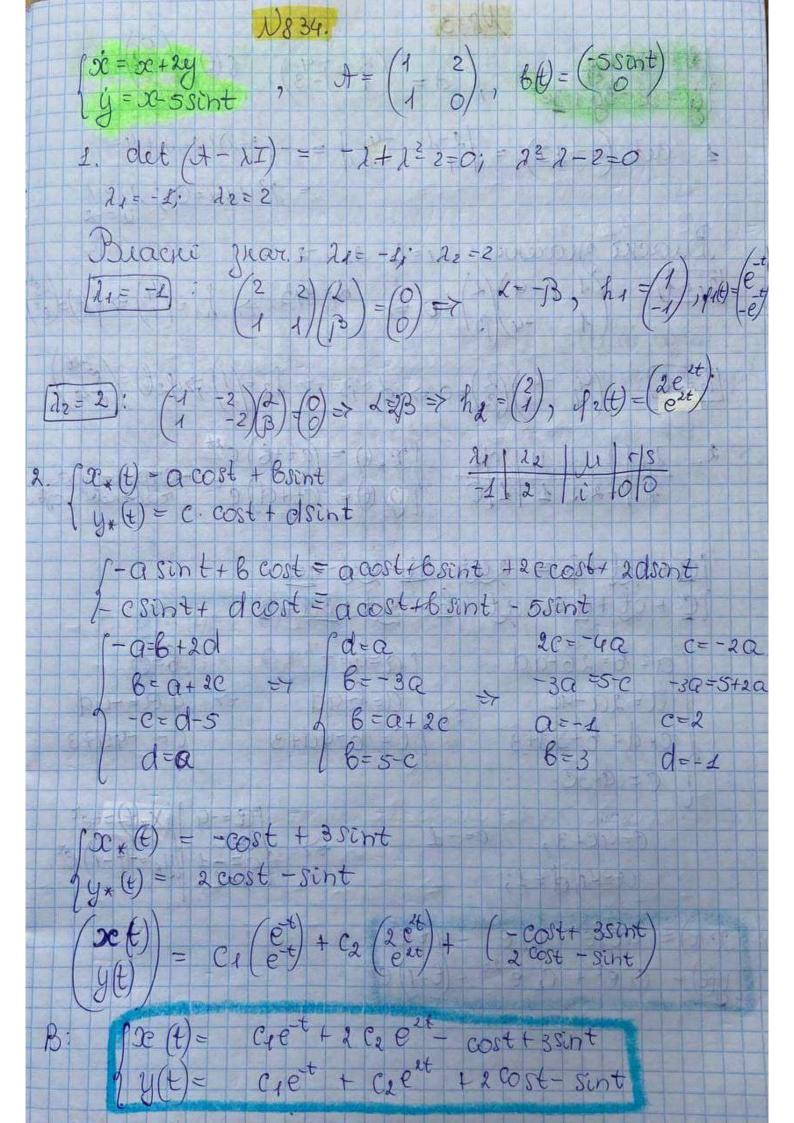




 $[2]_{2}=-1$ ;  $(1)_{3}=0$   $\Rightarrow$   $[2]_{2}=-3$   $\Rightarrow$   $[2]_{2}=-2$ ;  $[2]_{3}=-2$ ;  $[2]_{3}=-2$ ;  $[2]_{3}=-2$ ; OPEP:  $y(t) = \begin{pmatrix} e^t \\ e^t \end{pmatrix}$ ,  $y_2(t) = \begin{pmatrix} e^{-6} \\ -e^{-t} \end{pmatrix}$ 2. Tauge racmoboro hozb'azeg keognohignoi cucrem

[si=y+2et]
[y=x+t']

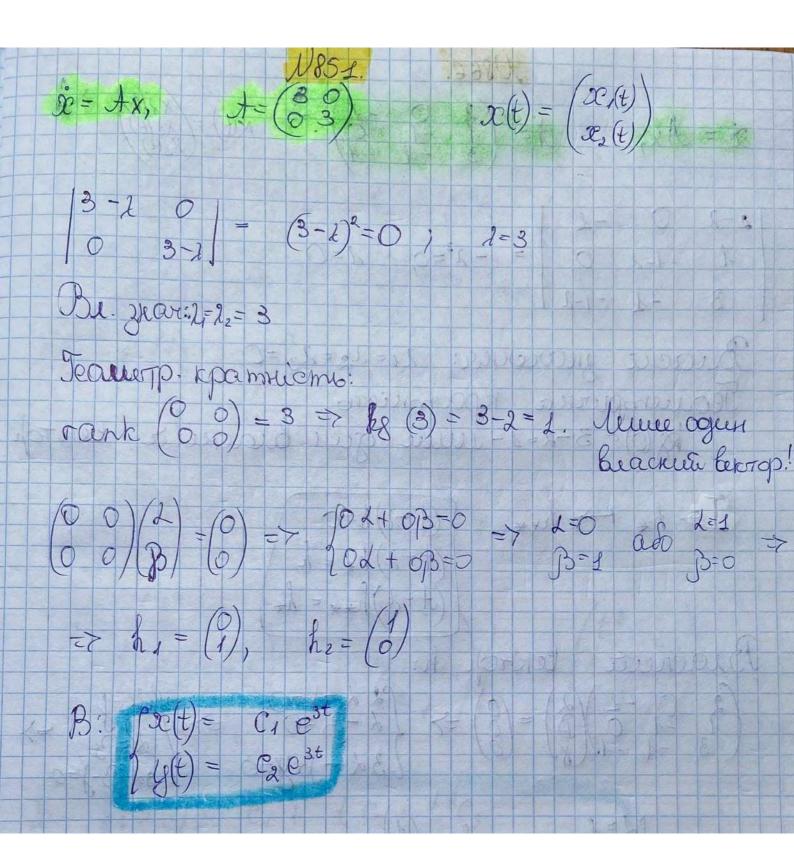
[y=x+t'] Jx. (1) = (at+6) et 1 y. (t) = (ct+d) et -структура часткового розв. 21 /2 11 5/3 1 -1 100 1a+at+B= ct+d+2 arc ate=2, a=1 alf6 = dt2 1 c+c++d= at+8 C=a B= d+1 c+d=B B =0  $(x * (t) = -t^2 2)$ B = at1 0=-1  $\frac{\mathcal{Z}(t)}{u(t)} = C_1 \begin{pmatrix} e^t \\ e^t \end{pmatrix} + C_2 \begin{pmatrix} e^t \\ -e^t \end{pmatrix}$ B: x (e) = c1et + c2et + tet-t=2

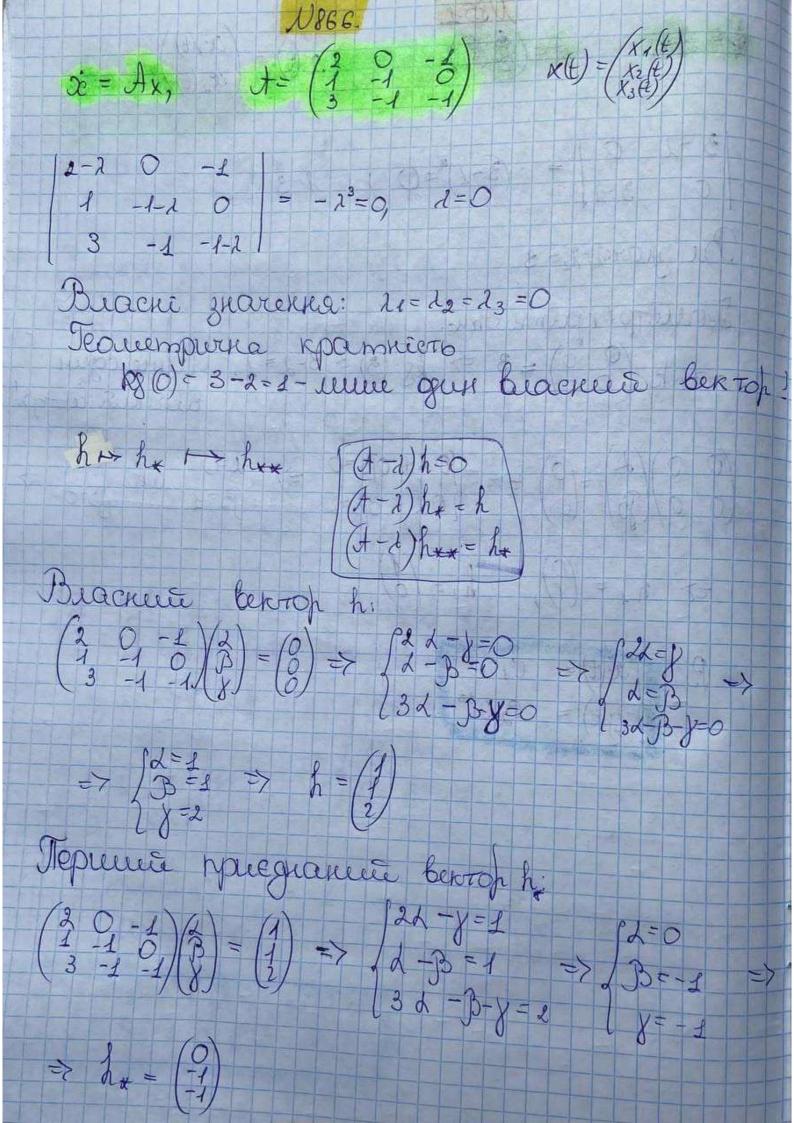


 $|\hat{y} = 2x - 4y|$   $|\hat{y} = x - 3y + 3e^{\frac{1}{2}}|$ ,  $|\hat{y}| = |\hat{y}| + 3e^{\frac{1}{2}}|$  $|\dot{y} = \mathcal{L} = 3y + 3e$ 1.  $\det(A - \lambda I) = |2 - \lambda - y| = -(3+\lambda)(2-\lambda) + 4 =$ 2.  $\det(A - \lambda I) = |1 - \lambda - y| = -(3+\lambda)(2-\lambda) + 4 =$   $= |2 + \lambda - z| = 0$   $= |2 + \lambda - z| = 2$ Buache zharenna: 11=1, 12=-2

[21=1): (1-4)(2)=0=7 2=43 =7 1=(4)=74(1)=(4)

[1-4)(3)=0=7 [22=2] (4, -4)(2)=0 => L=B=7 &2=(1) => (2)=0=20) 2. 21/22 11/15 (2xt) = (at+6) et - crpyorypa 1 -2 1 1 10 2 yxt) = (ct+d) et cartrol post. 19+at+6= 2at+26-4d-4d 1c + ct +d = at +6 - 3ct -3d+3 C=4C+3, C=-1 a=4,d=1; B1 (20t) = 4010 + C20 -460 24(t) - C1 et + C2 e-2t - (t-1) et





regue npuegnancie bekog her  $\begin{pmatrix} f \\ 1 \end{pmatrix} \mapsto h_{\star} = \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix} \mapsto h_{\star\star} = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$  $\varphi_1(t) = e^{\circ} \begin{pmatrix} 1 \\ t \\ 2 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$  $g_2(t) = c^{\circ} t \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix} + \begin{pmatrix} 0 \\ -1 \\ -1 \end{pmatrix} = \begin{pmatrix} t \\ t - 1 \\ 2t - 1 \end{pmatrix}$  $y_3(t) = e^{\circ} \left( \frac{t^2}{2} \left( \frac{1}{2} \right) + t \left( \frac{0}{2} \right) + \left( \frac{0}{2} \right) \right) =$  $color 2c(t) = c_1 + t_2 + t_2 + t_3 \\
color 2c(t) = c_1 + (t_1) c_2 + (t_2 - 2t_1) c_3 \\
color 2c(t) = 2c_1 + (2t_1) c_2 + (2t_2 - 2t_1) c_3$ Bi