90.1.27 *Clubb*



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. . . $(|X_1||_2)$

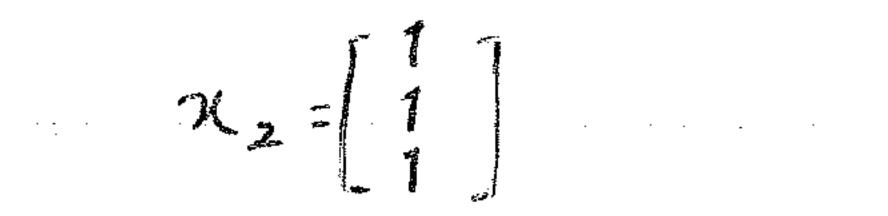
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 $\|x_1\|_1 = \sum_{j} |x_i| = 2+3+1 = 6$ · · · · · · ·

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$$\|\chi_1\|_2 = \sqrt{x} \cdot x = \sqrt{4+9+1} = \sqrt{14} = 3.74$$



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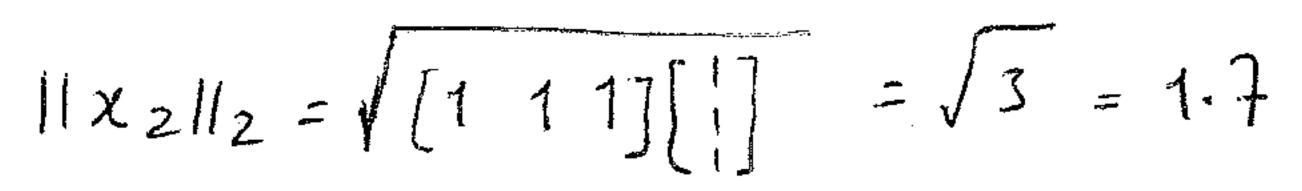
 $11x_2 |1_{\infty} = 1$

 $A_{1} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ · · · ·

 $\|X_i\|_{\infty} = Man |x_i| = |-3| = 3$

 $\|\chi_2\|_1 = t t t + t = 3$

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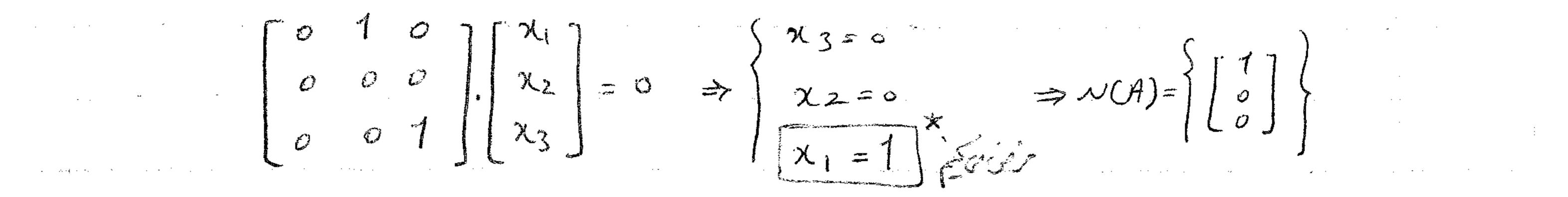
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 $\begin{array}{ccccccccccc} c_{3}+c_{2}+c_{1}\rightarrow c_{1} & 1 & 0 \\ \hline & 0 & 0 & 1 \\ \hline & 1 & 0 & 1 \end{array} \xrightarrow{c_{2}\rightarrow c_{3}} \begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ \hline & 1 & 0 & 1 \end{bmatrix} \xrightarrow{r_{F}\rightarrow r_{3}} \begin{bmatrix} 1 & 0 & 1 \\ 1 & 0 & 0 \\ \hline & 0 & 0 & 0 \\ \hline & 1 & 0 & 1 \end{bmatrix} \xrightarrow{r_{F}\rightarrow r_{3}} \begin{bmatrix} 1 & 0 & 1 \\ 1 & 0 & 1 \\ \hline & 0 & 0 & 0 \\ \hline & 0 & 0 & 0 \\ \hline \end{array}$

AX = 0

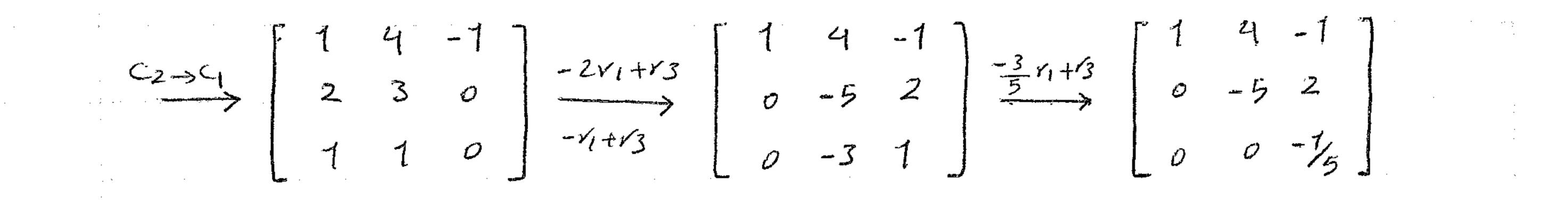
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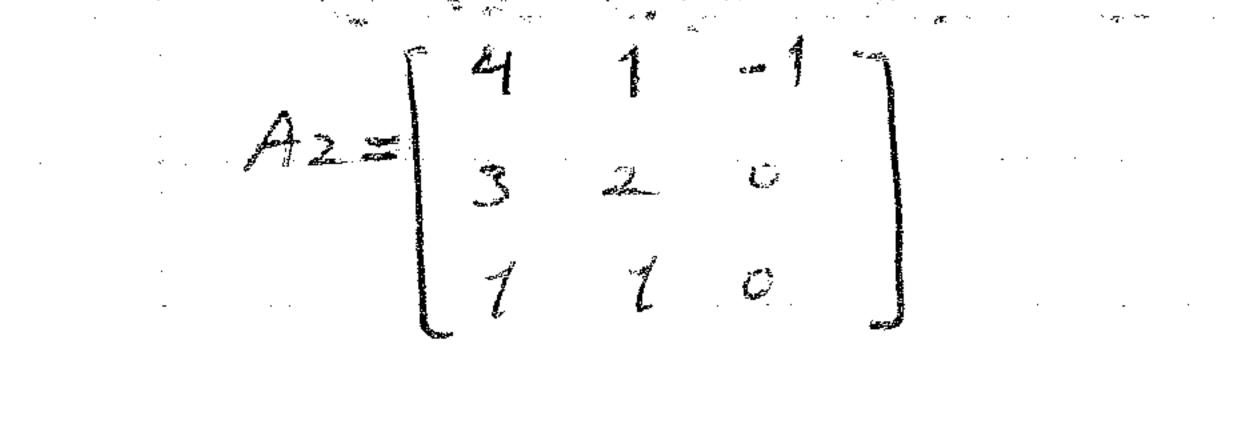


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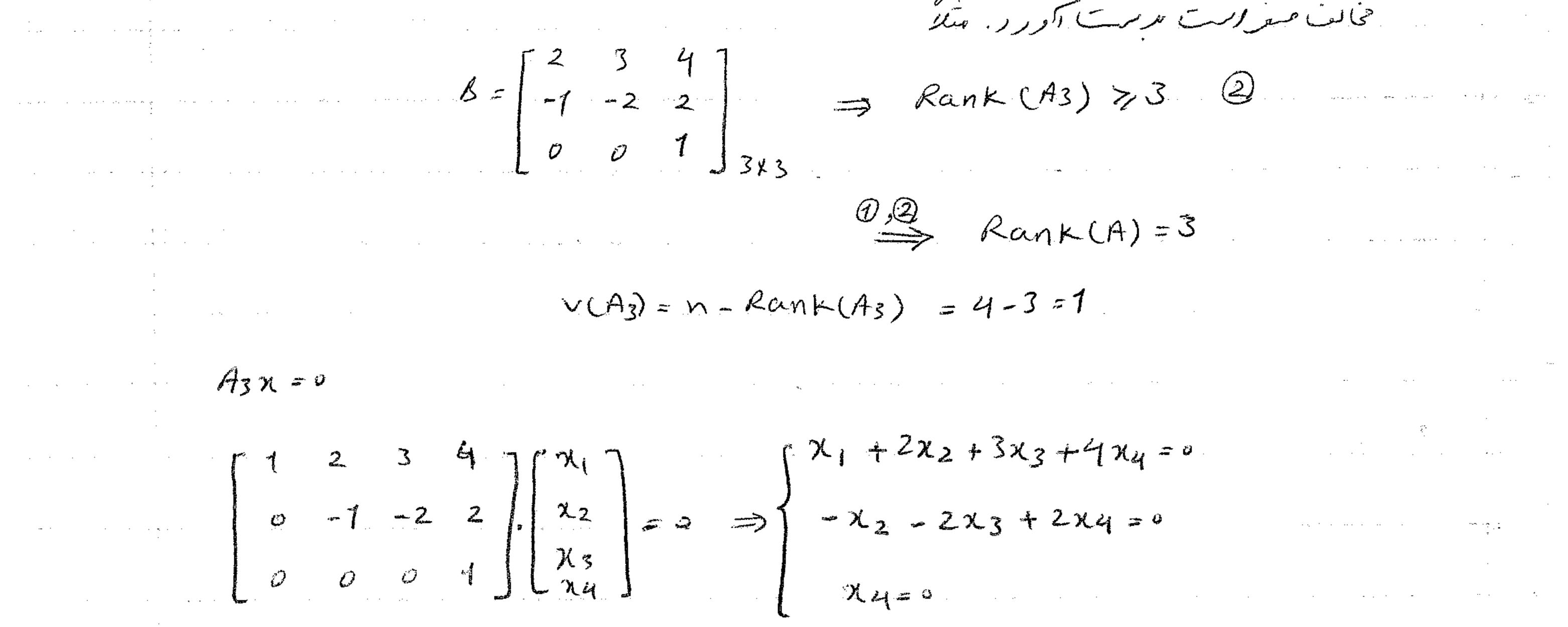
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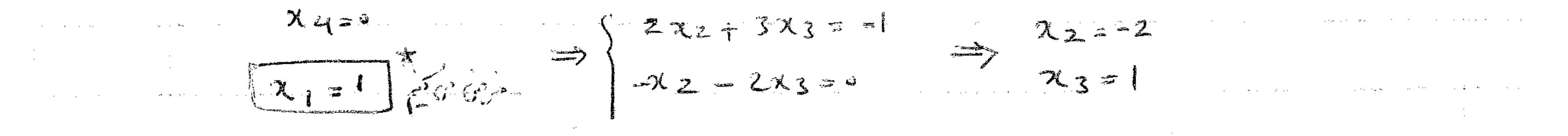
 $\frac{7}{5^{12}t^{1}} \begin{bmatrix} 1 & 0 & \frac{3}{5} \\ 0 & -5 & 2 \\ 0 & 0 & -\frac{7}{5} \end{bmatrix} \xrightarrow{-\frac{3}{5}C_{1}+C_{3}} \begin{bmatrix} 1 & 0 & 0 \\ 0 & -5 & 0 \\ \frac{2}{5}C_{2}+C_{3} \end{bmatrix} \xrightarrow{0} \begin{bmatrix} 1 & 0 & 0 \\ -\frac{7}{5} & 0 \\ 0 & 0 & -\frac{7}{5} \end{bmatrix} \xrightarrow{-\frac{7}{5}r_{3}} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Rank(A2) = 3

 $v(A) = n - Rank(A) = 3 - 3 = 0 \quad \text{Mars}$

 $A_3 = \begin{bmatrix} 4 & 2 & 3 & 4 \\ 0 & -1 & -2 & 2 \\ 0 & 0 & 1 \end{bmatrix} \quad det(A_3) = 0 \implies Rank(A) \le 3 \textcircled{0}$ $iuin_{5} \times 3B \quad v_{5} = v_{5} + v_$







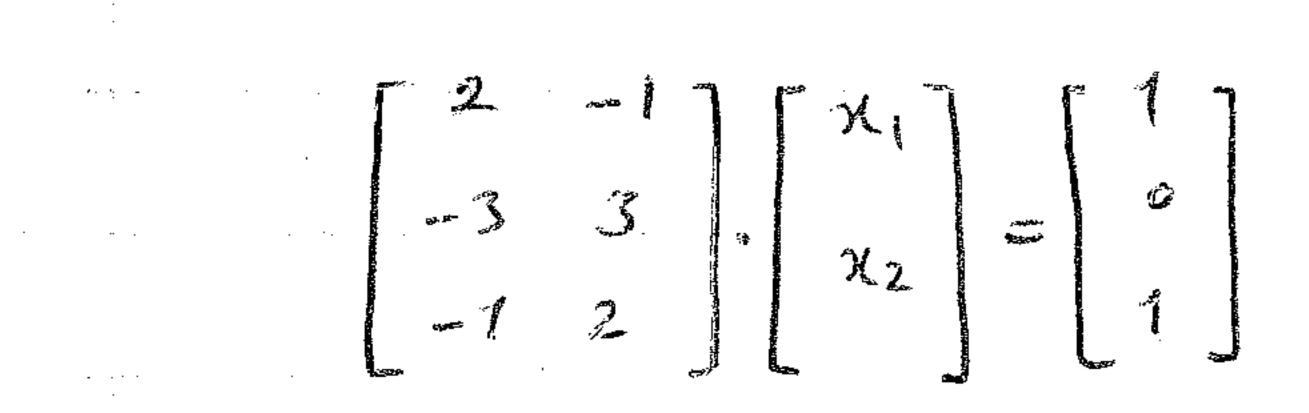
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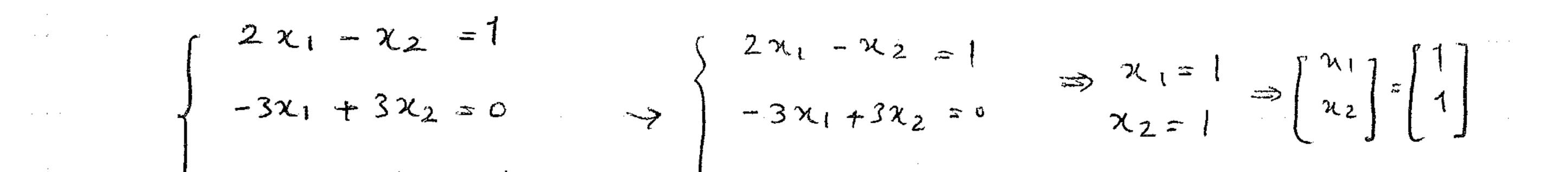
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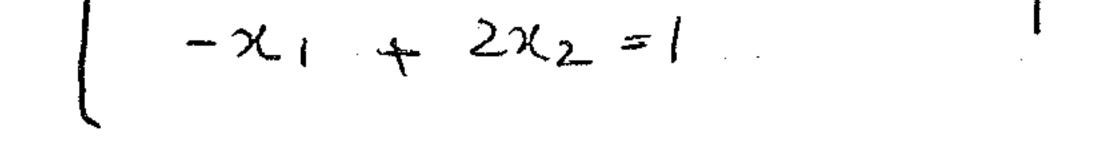
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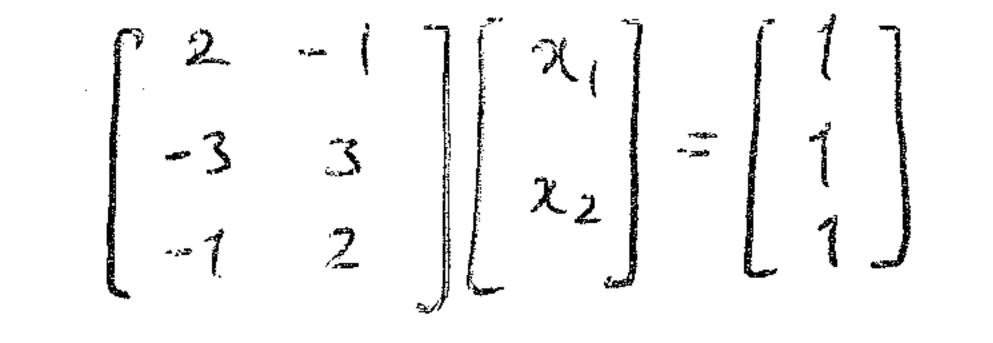




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 $\begin{cases} 2n_1 - n_2 = 1 \\ -3n_1 + 3n_2 = 1 \\ -n_1 + 2n_2 = 1 \end{cases} \xrightarrow{>} 2n_1 - n_1 + 3n_2 = 4$

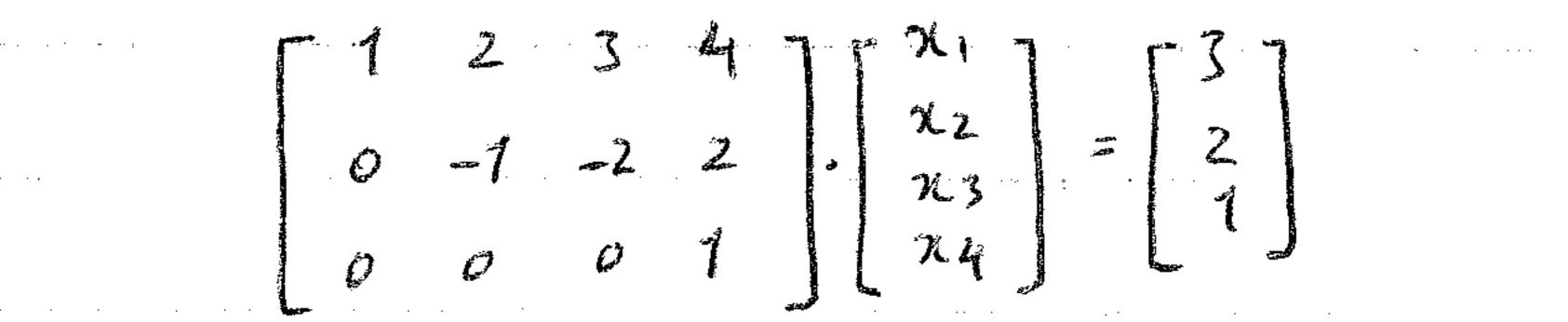
 $2 \chi_1 - \chi_2 = 1$

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 $\Rightarrow \chi_1 = \frac{2}{3} \rightarrow \frac{1}{3} \xrightarrow{1} \xrightarrow{1} \frac{1}{3} \xrightarrow{1} \frac{1}{3} \xrightarrow{1} \frac{1}{3} \xrightarrow{1} \frac{1}{3} \xrightarrow{1} \frac{1}{3$

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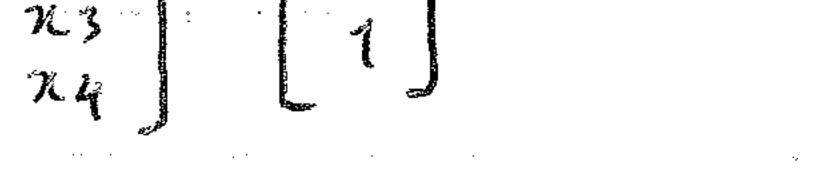
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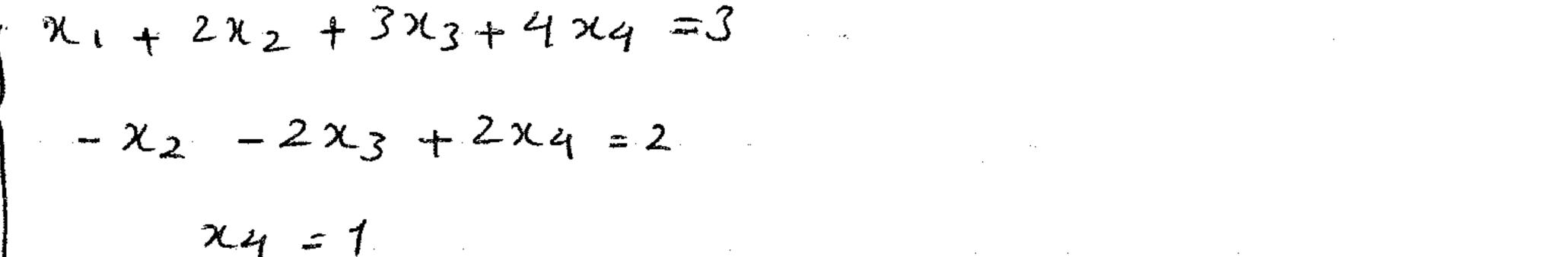




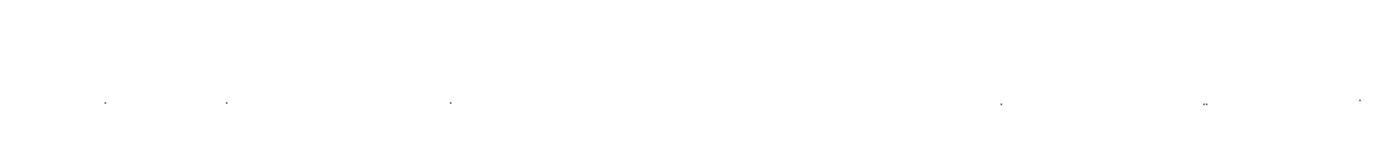




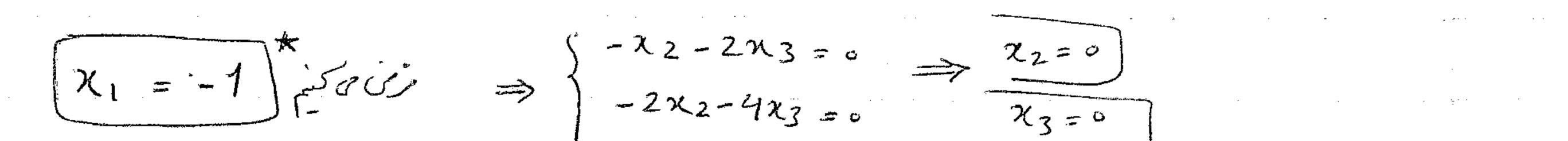


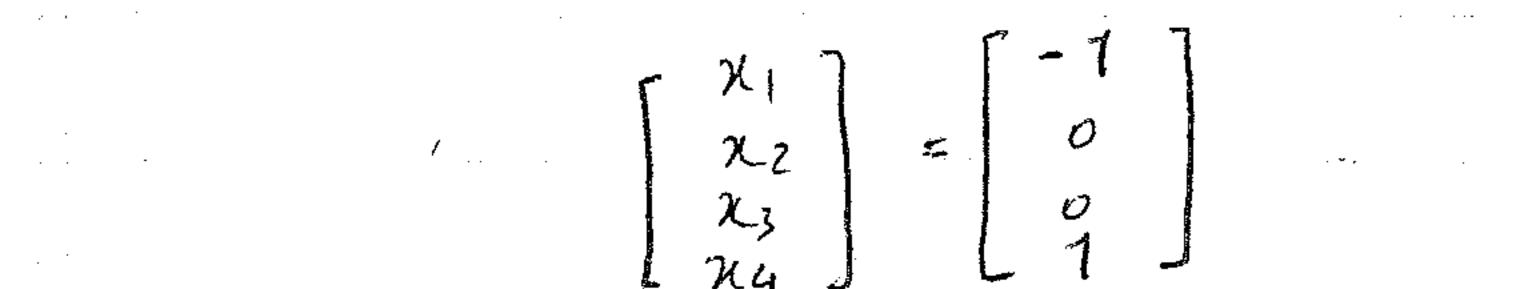












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 $(A_{j} - \lambda I) = \begin{vmatrix} 1 - \lambda & -\eta & 10 \\ 0 & 2 - \lambda & 0 \end{vmatrix} \Rightarrow det (A - \lambda I) = -\lambda^{3} + 6\lambda^{2} - 11\lambda + 6 = 0$

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 $A_1 = T' A T = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \end{bmatrix}$

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 $A_{2} = \begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 0 \end{bmatrix}$

 $\lambda_1 = 1$, $\lambda_2 = 2$, $\lambda_3 = 3$.

فرم جرف فرارد.

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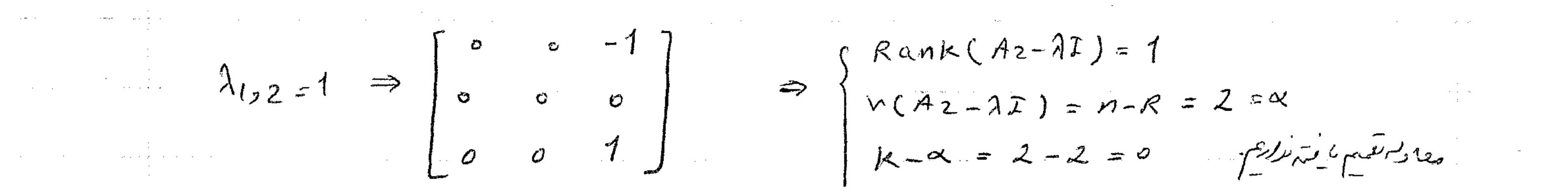
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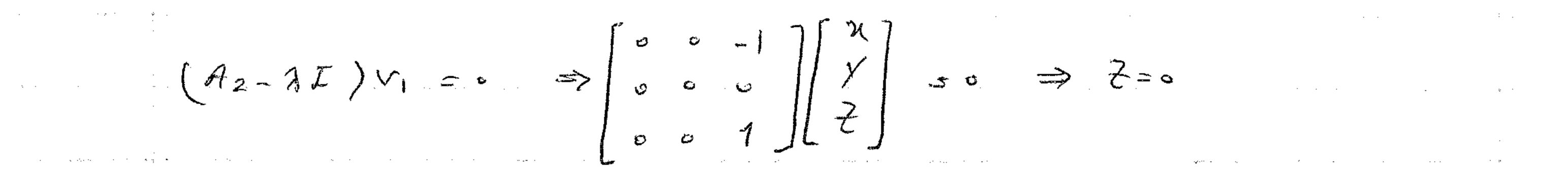
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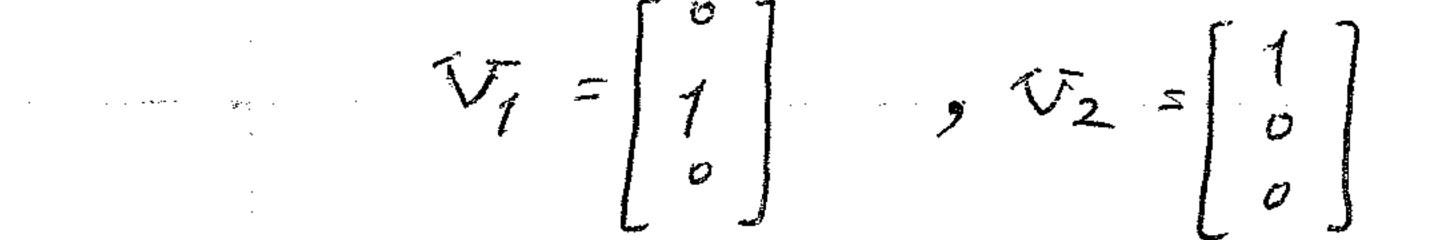
$$(A_2 - AI) = \begin{bmatrix} 1 - \lambda & 0 & -1 \\ 0 & 1 - \lambda & 0 \\ 0 & 0 & 2 - \lambda \end{bmatrix} \implies det(A_{T} - \lambda I) = -\lambda^3 + 4\lambda^2 - 5\lambda + 2 = 0$$

$$\lambda_{12} = 1 \quad 2 = \lambda^3 + 4\lambda^2 - 5\lambda + 2 = 0$$

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$$(A_2 - \lambda_3 I)V_3 = 0 \implies \begin{bmatrix} -1 & 0 & 1 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} \chi \\ \chi \\ \chi \end{bmatrix} \implies \begin{cases} -\chi + \xi = 0 \\ \chi = 0 \end{cases}$$

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 $J = T : A \cdot T = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$

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 $A_3 = \begin{bmatrix} 0 & 4 & 3 \\ 0 & 20 & 16 \\ 0 & -25 & -20 \end{bmatrix}$

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 $(A_3 - 1I) = \begin{bmatrix} -2 & 4 & 3 \\ 0 & 20 - 2 & 16 \\ 0 & -25 & -20 - 2 \end{bmatrix}$

 $\Rightarrow det (A_3 - \lambda I) = -\lambda^3 = 0$

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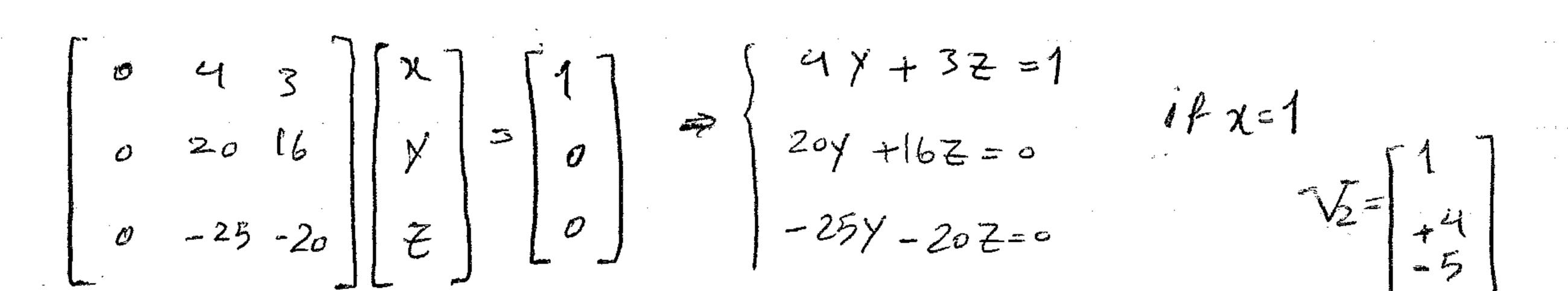
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ومعادله تعيم ٤ مترولهم .

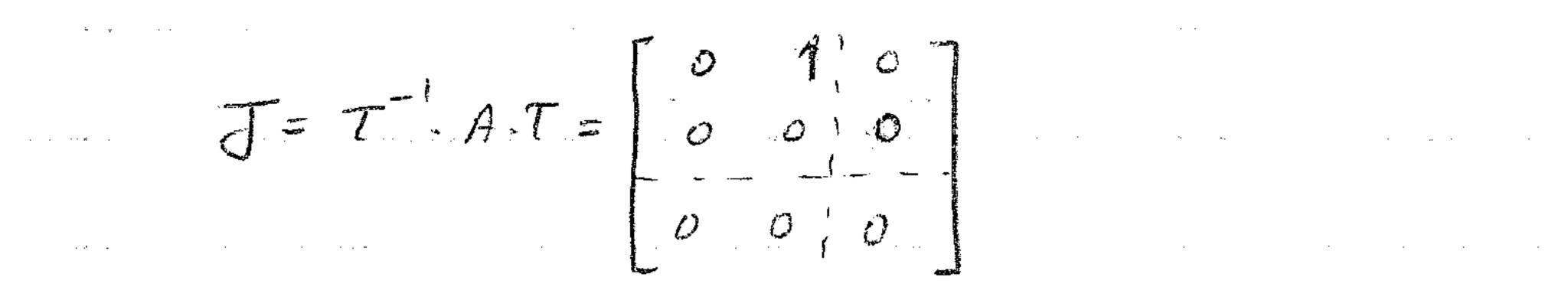
 $\begin{bmatrix} 0 & 4 & 3 \\ 0 & 20 & 16 \\ 0 & -25 & -20 \end{bmatrix} \begin{bmatrix} \chi \\ Y \\ Z \end{bmatrix} = 0 \implies \begin{cases} 4Y + 3Z = 0 & \text{if } \chi = 1 \\ 20Y + 16Z = 0 & V_1 = \begin{bmatrix} 1 \\ 0 \\ -25Y - 20Z = 0 & V_1 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$





 $\begin{bmatrix} 0 & 4 & 3 \\ 0 & 20 & 16 \\ 0 & -25 & -20 \\ z \end{bmatrix} \begin{bmatrix} 1 \\ -4 \\ -5 \end{bmatrix} = \begin{cases} 4y + 3z = 1 \\ 20y + 16z = -4 \\ -25y - 20z = 5 \end{cases} \quad if x = 1 \\ \frac{1}{\sqrt{3}} = \begin{bmatrix} 1 \\ 7 \\ -25y - 20z = 5 \end{bmatrix}$





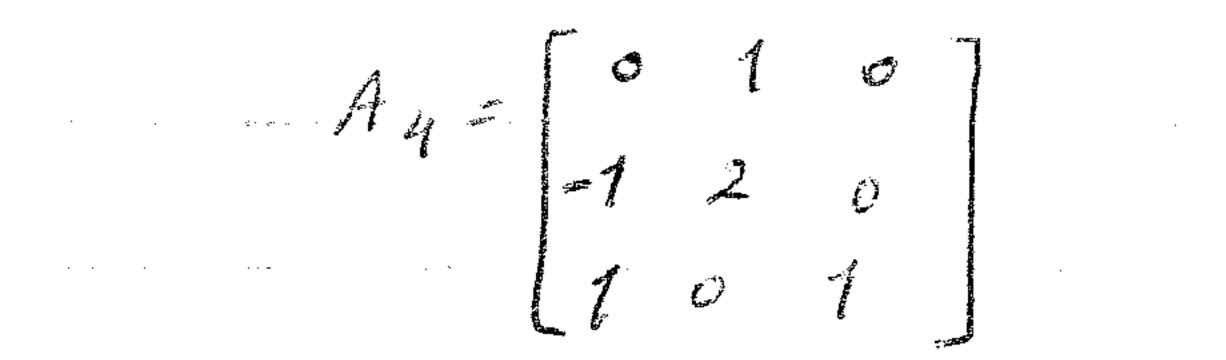
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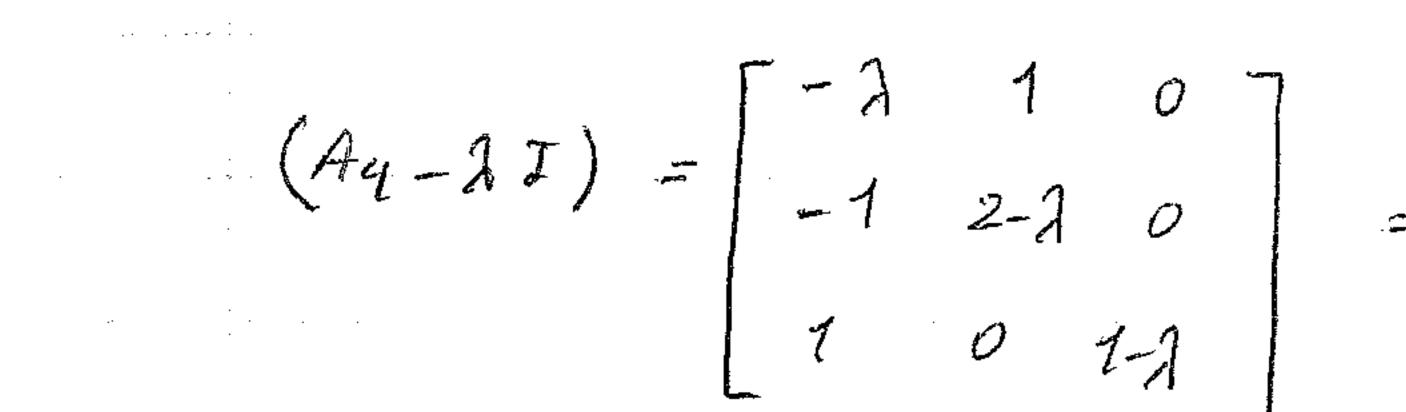
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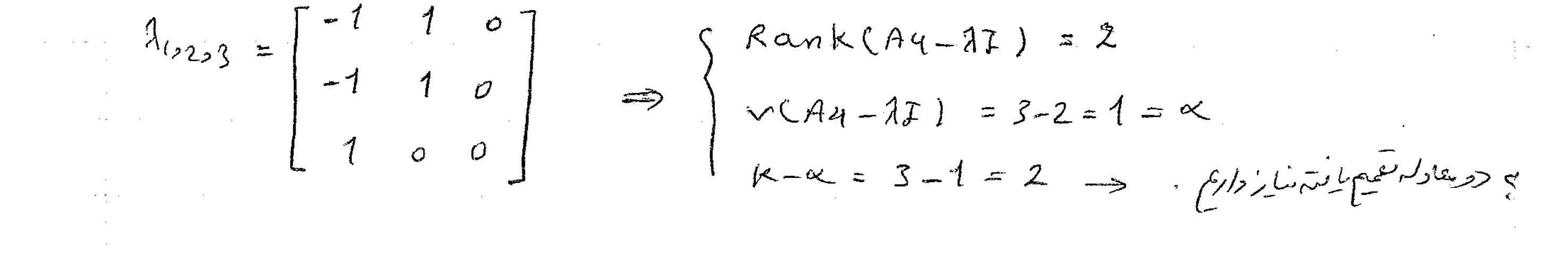


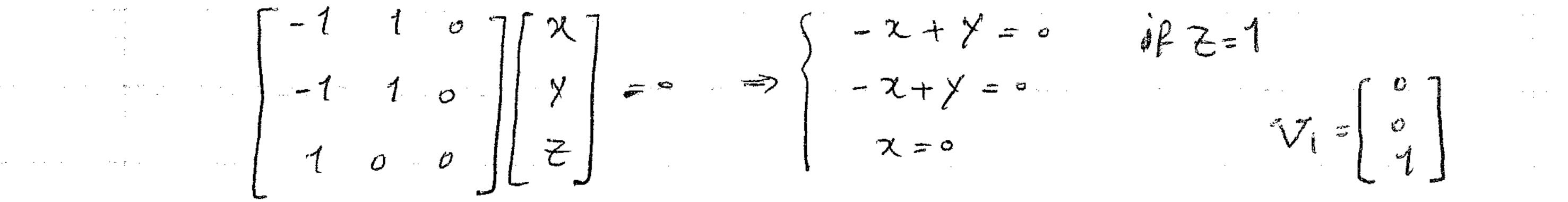
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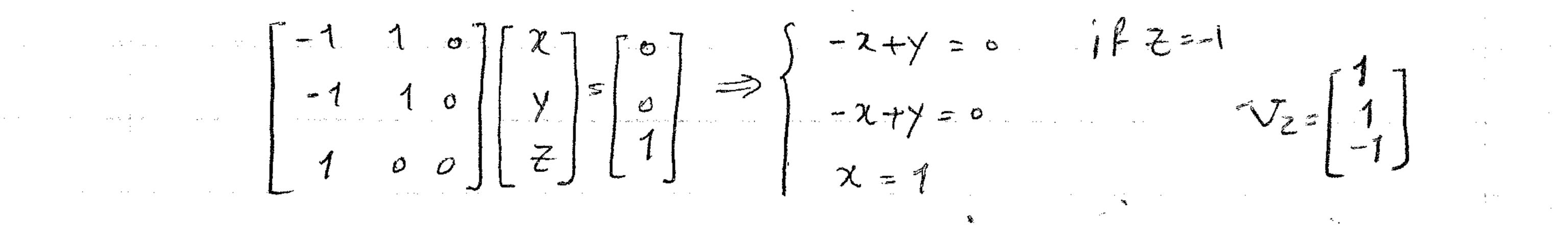
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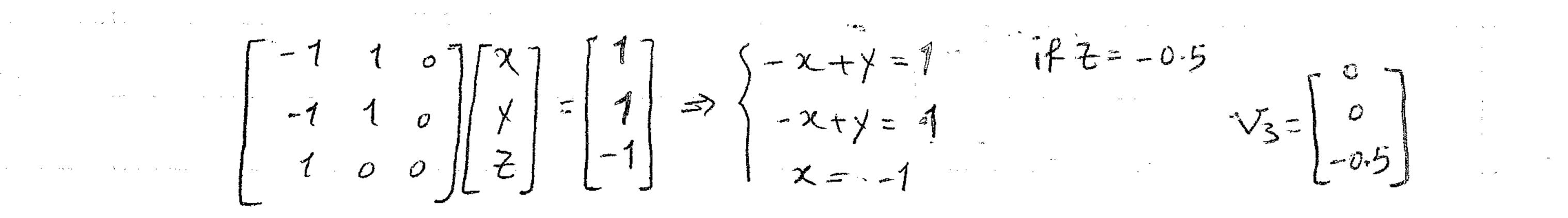
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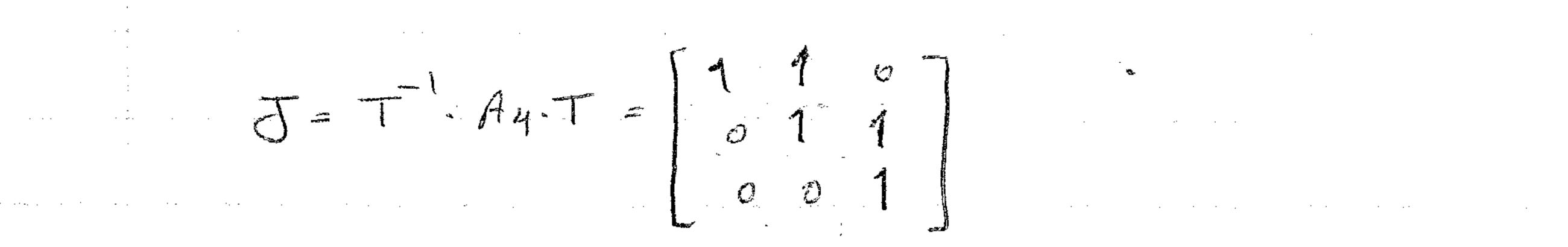
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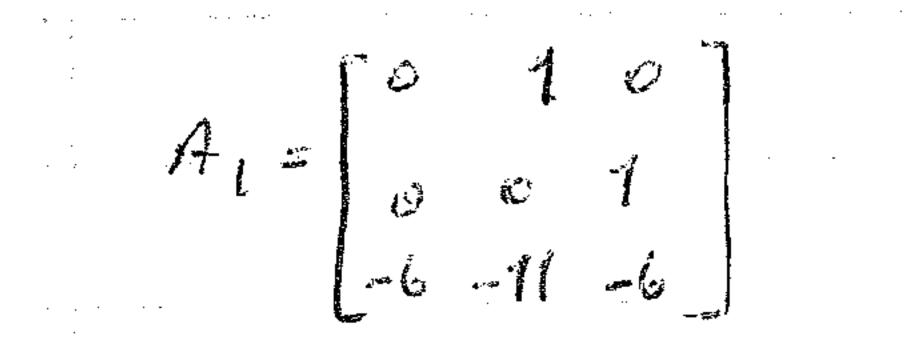
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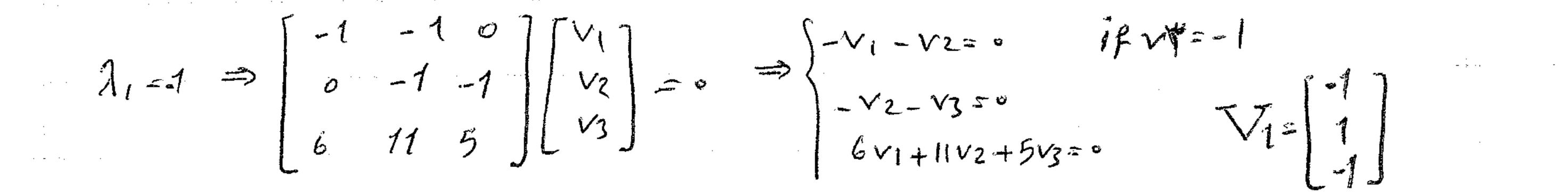


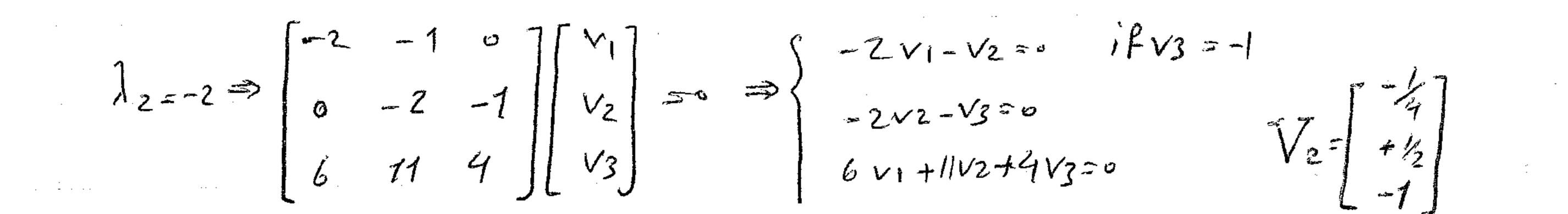
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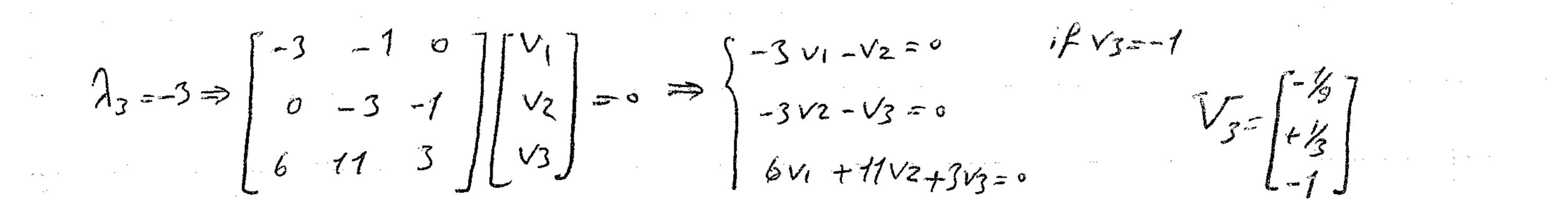
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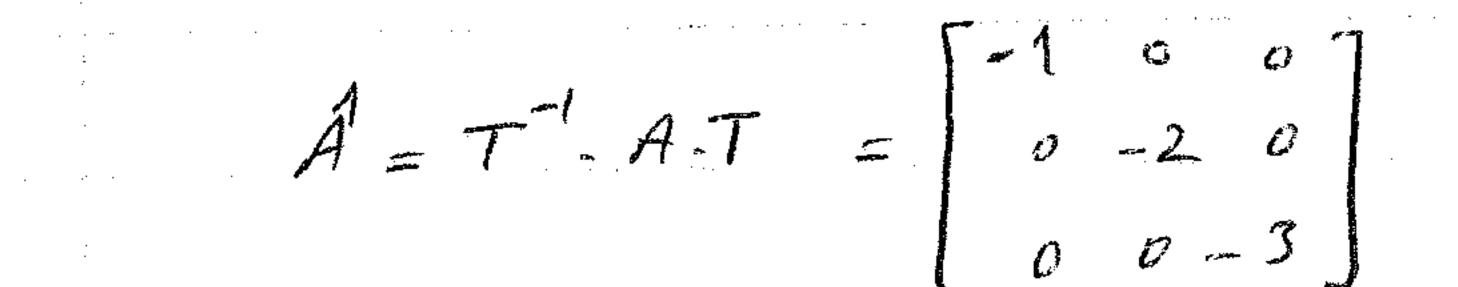
· · · · $\Rightarrow det(\lambda I - A_1) = \lambda^3 + 6\lambda^2 + 11\lambda + 6 = 0$ $\lambda_1 = -1$, $\lambda_2 = -2$, $\lambda_3 = -3$

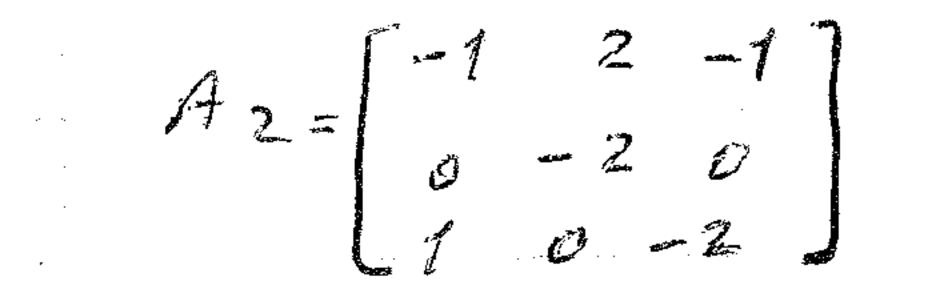
 $(\lambda I - A_i) = \begin{bmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \end{bmatrix}$ $\begin{bmatrix} \lambda & -1 & 0 \\ -1 & \lambda & -1 \end{bmatrix}$ $\begin{bmatrix} \lambda & -1 & 0 \\ -1 & \lambda & -1 \end{bmatrix}$



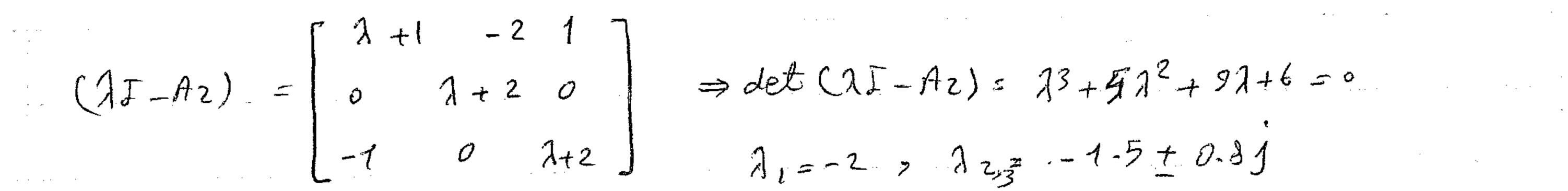








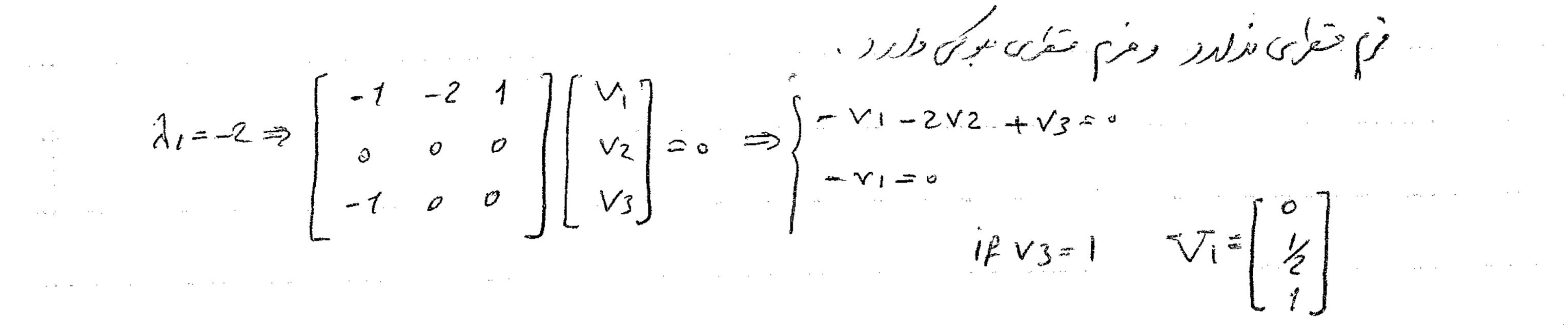
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 $\begin{cases} (-0.5+0.8i) v_1 - 2v_2 + v_3 = 0 \\ (0.5+0.8i) v_2 = 0 \\ -v_1 + (0.5+0.8i) v_3 = 0 \end{cases} \xrightarrow{V_2 = 0} \xrightarrow{V_2 = 0} \xrightarrow{V_{2,3}} \begin{bmatrix} -1-0.8i \\ 0 \\ 1 \end{bmatrix}$

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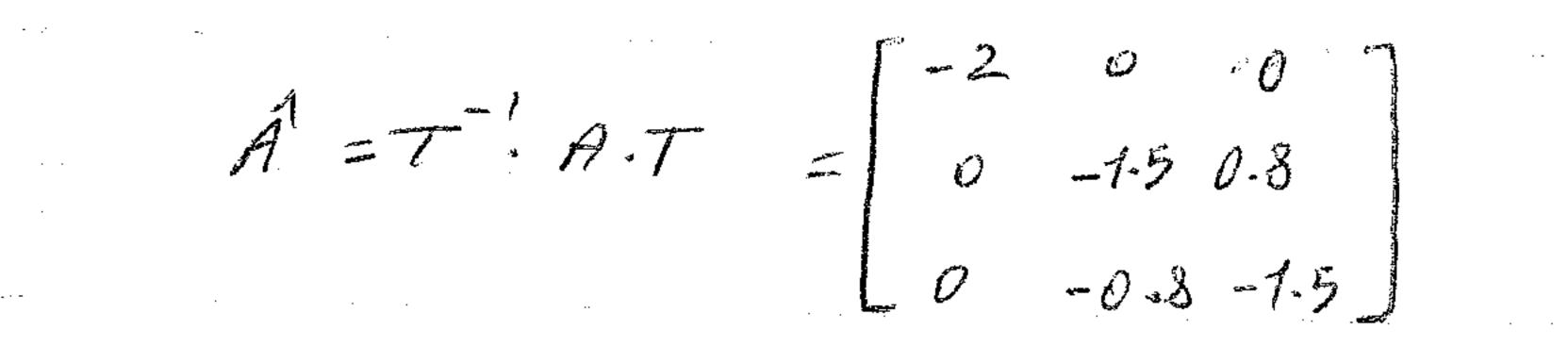
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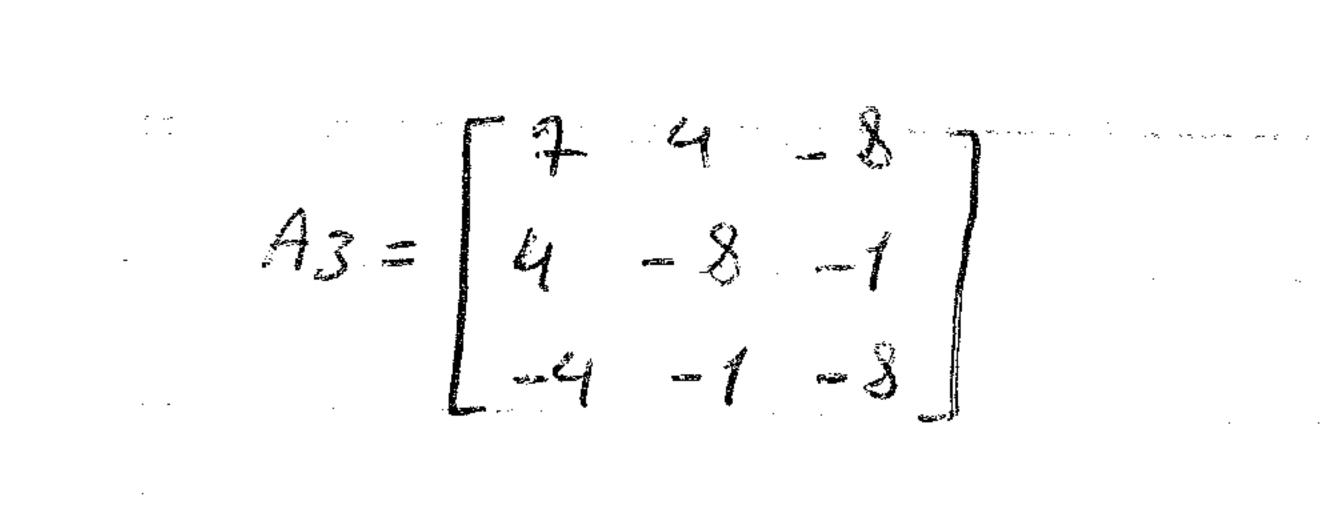
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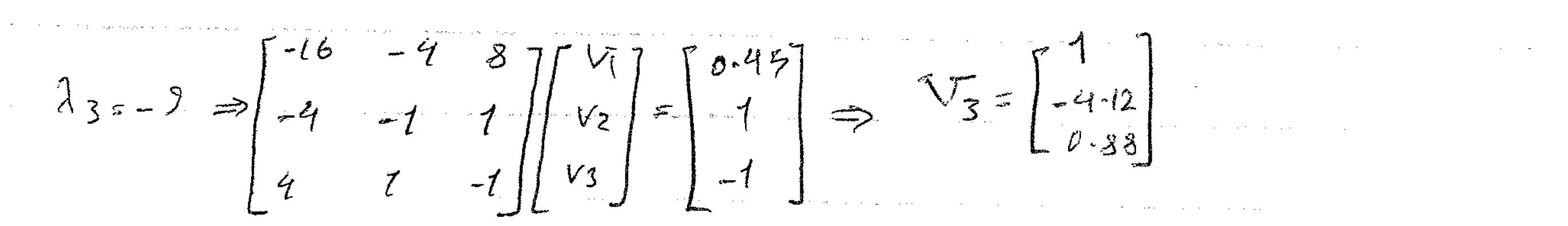


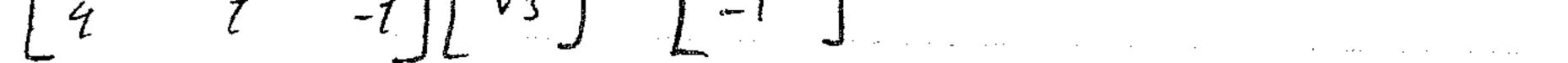
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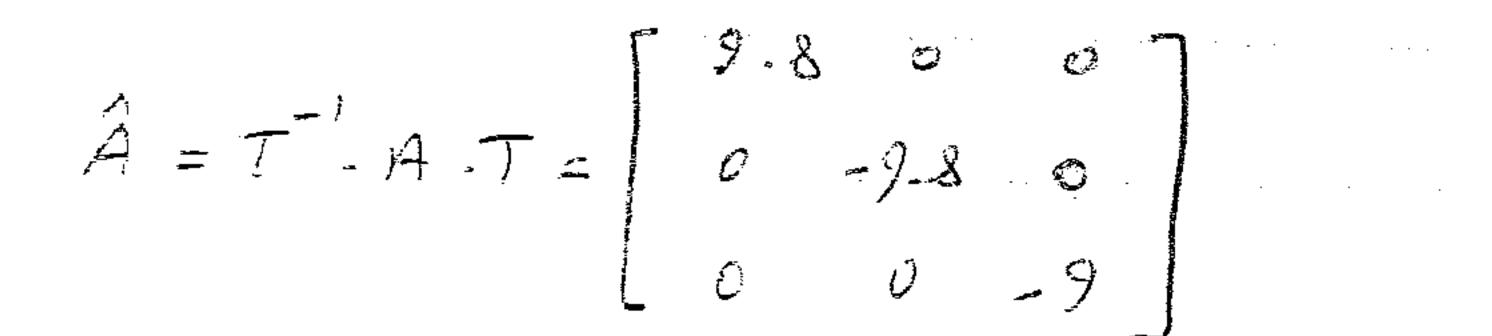
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$$(\lambda I - A_3) = \begin{pmatrix} \lambda - 7 & -4 & 8 \\ -4 & \lambda + 8 & 1 \\ 4 & 1 & \lambda + 8 \end{pmatrix} \Rightarrow det (\lambda I - A_3) = \lambda^3 + 8\lambda^2 + 15\lambda - 885 = 0 \lambda_1 = 9 - 8 \Rightarrow \begin{pmatrix} 2 - 8 & -4 & 8 \\ -4 & 17 - 8 & 1 \\ 4 & 1 & 17 - 8 \end{pmatrix} \begin{bmatrix} v_1 \\ v_2 \\ v_3 \end{bmatrix} = 0 \Rightarrow \begin{cases} 2 - 8 v_1 - 4v_2 + 8v_3 = 0 \\ -4v_1 + 17 - 8v_2 + v_3 = 0 \\ 4v_1 + v_2 + 17 - 8v_3 = 0 \\ 4v_$$







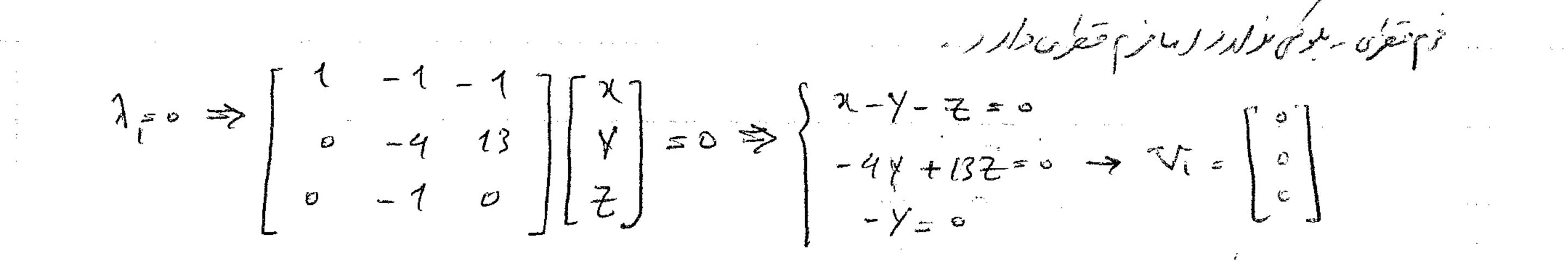
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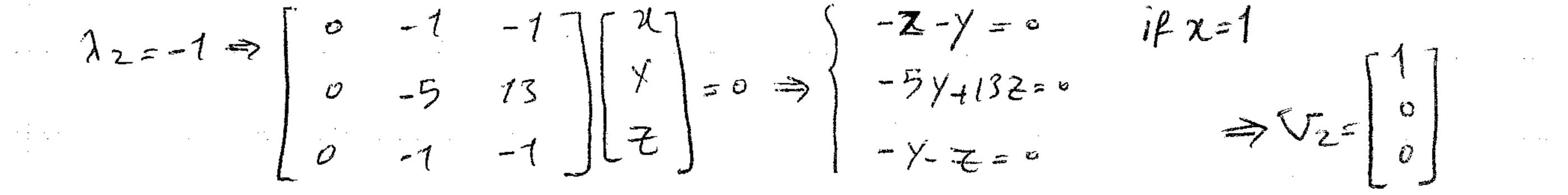
 $A = \begin{bmatrix} -1 & 1 \\ 0 & 4 & -13 \end{bmatrix}$

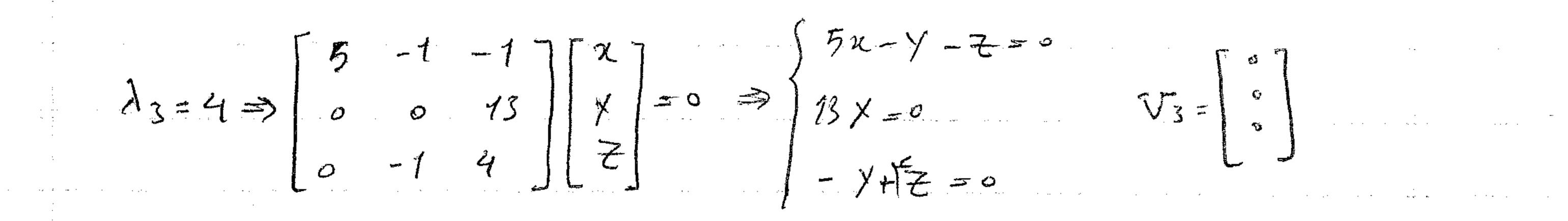
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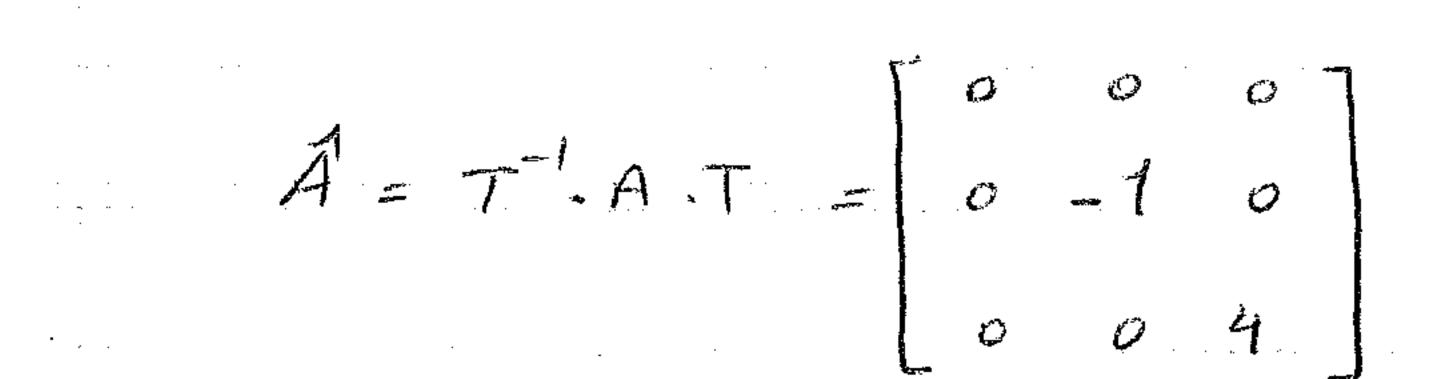
 $(\widehat{J}\overline{J}-A) = \begin{bmatrix} \widehat{\lambda}+1 & -1 & -1 \\ 0 & \widehat{\lambda}-4 & 13 \end{bmatrix} \Rightarrow \det(\widehat{\lambda}\overline{J}-A) = \widehat{\lambda}^3 - 3\widehat{\lambda}^2 - 4\widehat{\lambda} = 0$ $\widehat{\lambda}_{1} = 0 \quad 2\widehat{\lambda}_{2} = -1 \quad 2\widehat{\lambda}_{3} = 4$

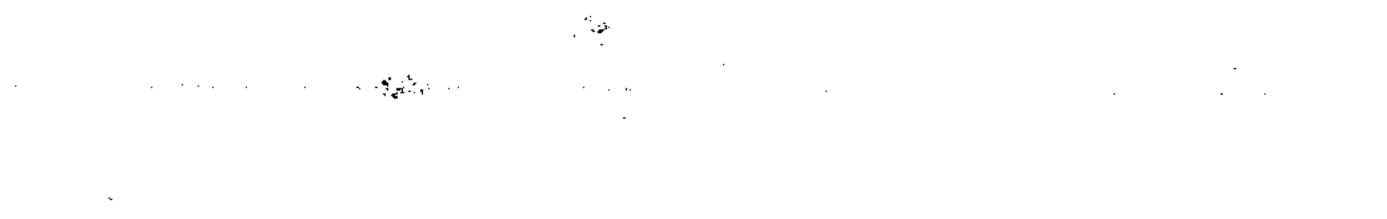




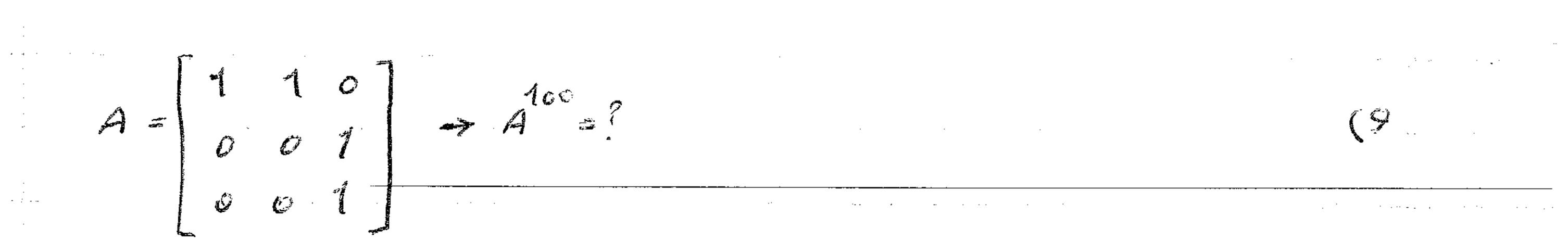








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$$det(\lambda I - A) = det \left[0 \quad \lambda - 1 \right] = 0 \implies \lambda_1 = 0 \quad \lambda_2 = 1$$

 $F(A) = A^{100}$

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 $L(\lambda) = \beta_2 \lambda^2 + \beta_1 \lambda + \beta_0$, $F(\lambda) = \lambda^{100}$

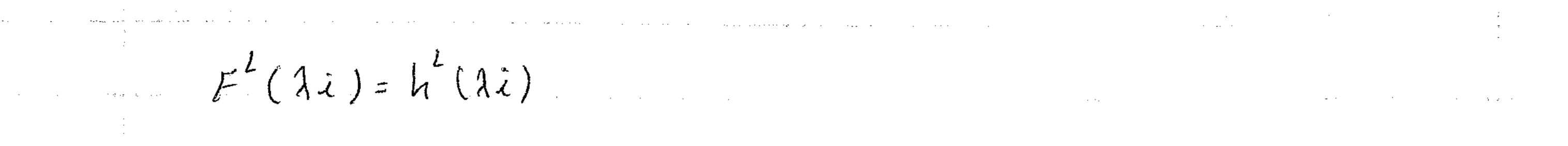
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 $F(\lambda_2) = h(\lambda_2) \rightarrow \beta_2 + \beta_1 = 1 \qquad \Rightarrow \begin{cases} \beta_1 = -98 \\ \Rightarrow \\ \beta_2 = -98 \end{cases}$ $F'(\lambda_2) = h'(\lambda_2) \rightarrow 2\beta_2 + \beta_1 = 100 \qquad \Rightarrow \qquad \beta_2 = 99$

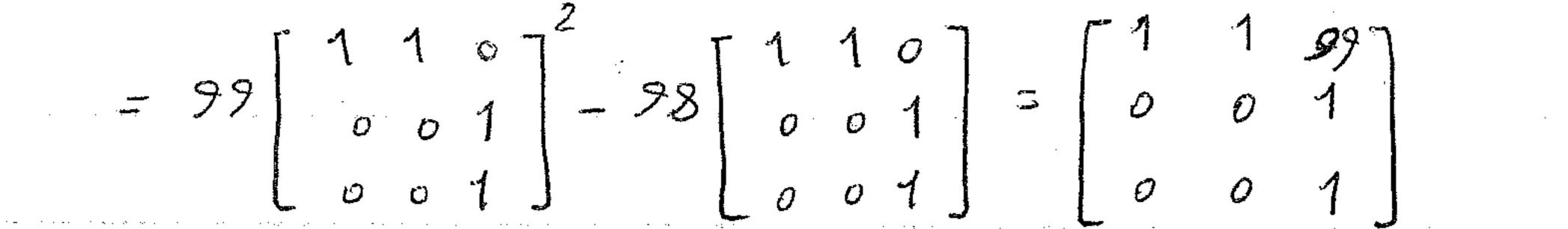
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 $F(\lambda_1=0) = h(\lambda_1=0) = (0)^{10} \Rightarrow \beta_0 = 0$



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 $F(A) = A^{100} = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}^{100} = h(A) = BzA^2 + B_1A + B_0 \cdot I$ $\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$ ·: · .

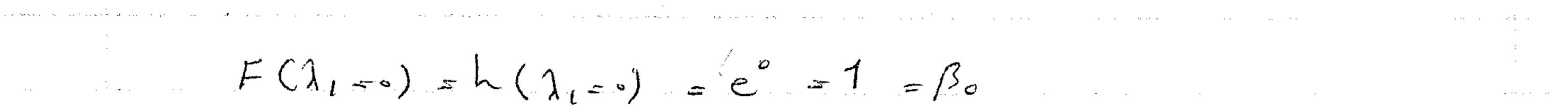


CAt 27 $F(A) = e^{At} \Rightarrow F(\lambda) = e^{\lambda t}$

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 $\mathcal{K}(\lambda) = \beta_2 \lambda^2 + \beta_1 \lambda + \beta_2 \lambda^2$

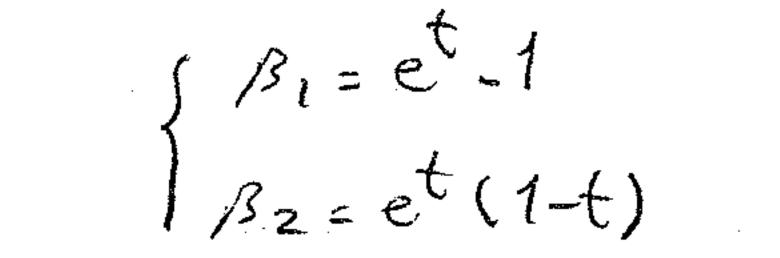


 $F'(\lambda_2) = h'(\lambda_2) \Rightarrow \mathbf{t}e^{\lambda t} = te^{t} = 2\beta_2 + \beta_1 + 1$ 1 <u>1</u> 1

$$F(\lambda_2) = h(\lambda_2) \Rightarrow et = B_{2+}B_{1+}I$$

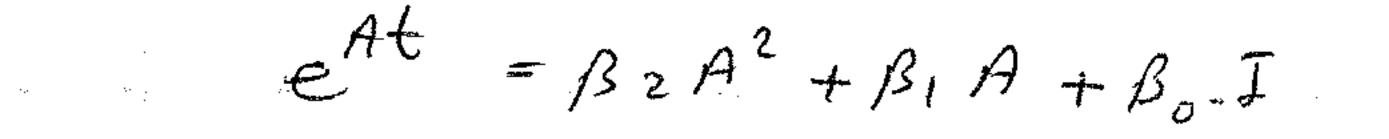
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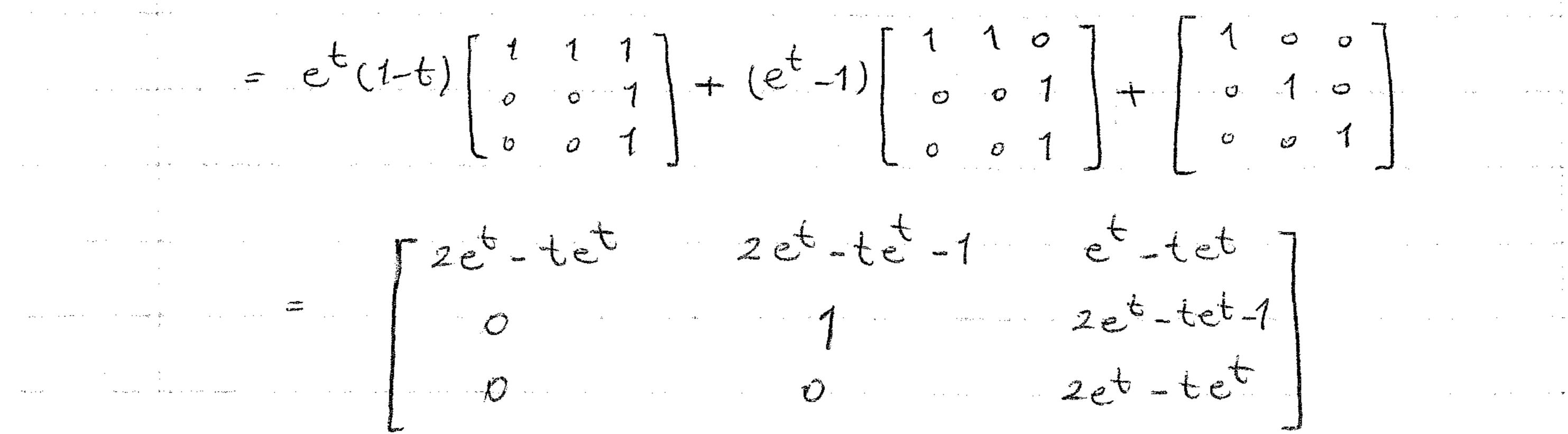
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 $(A - \lambda I) = -\lambda^3 + 5\lambda^2 + 5\lambda - 18 = 0$

 $(A - \lambda I) = \begin{bmatrix} 2 - \lambda & 3 & 2 \\ 3 & 1 - \lambda & 0 \end{bmatrix}$ -+± 113

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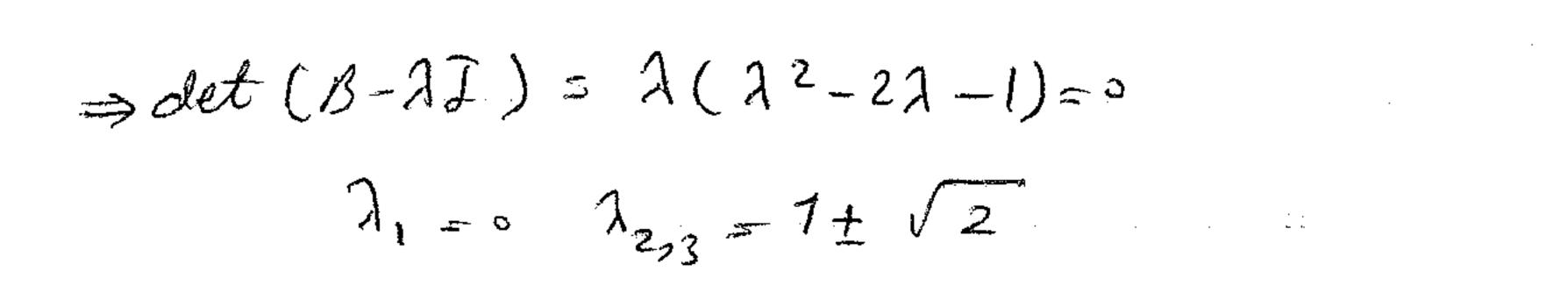
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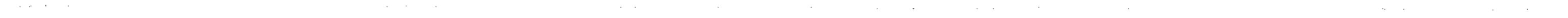


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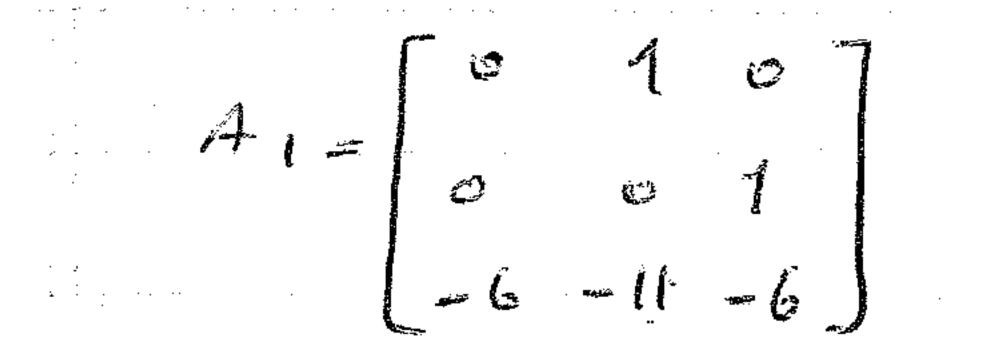
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 $B = \begin{bmatrix} 0 & 0 & -1 \\ 0 & 0 & 0 \\ -1 & 0 & 2 \end{bmatrix}$

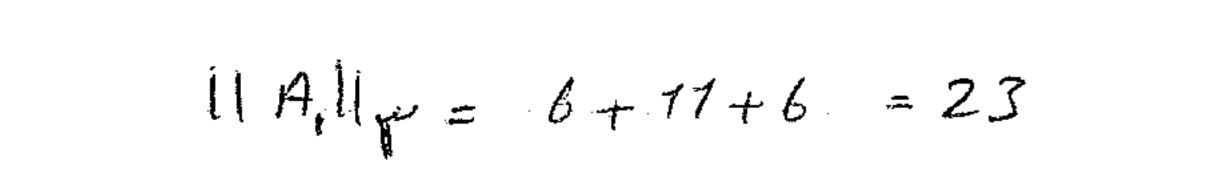
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 $(B - \lambda I) = \begin{bmatrix} -\lambda & -1 \\ 0 & -\lambda & 0 \\ -1 & 0 & 2-\lambda \end{bmatrix}$

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$$I|A_1||_2 = Man \int eig(A_1^T - A_1)$$

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$$\begin{array}{c} 0 & 0 & -6 \\ 1 & 0 & -11 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{array} \right] = \begin{bmatrix} 36 & 66 & 36 \\ 66 & 122 & 66 \\ 36 & 66 & 37 \end{bmatrix} = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \\ 0 & 0 & 2 \end{array} \right]$$

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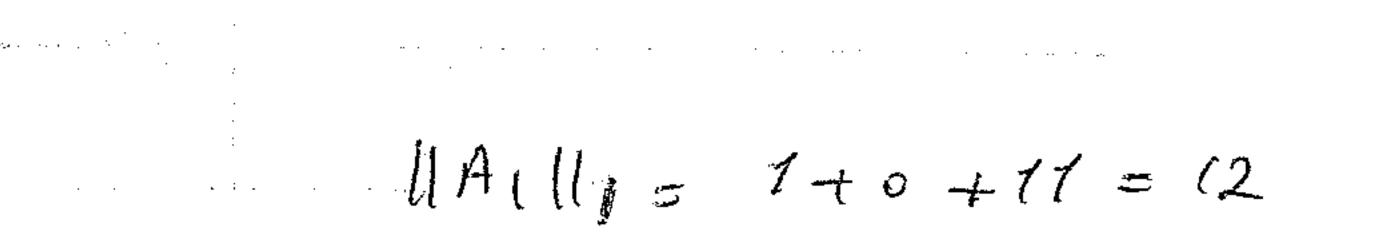
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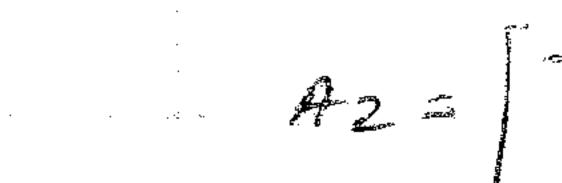
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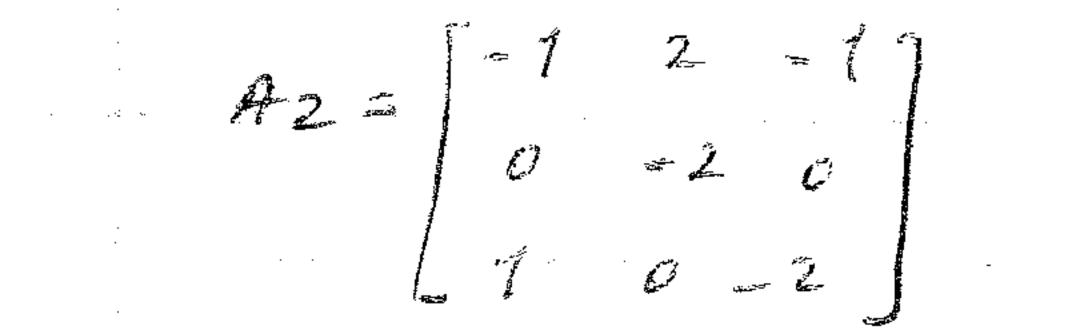


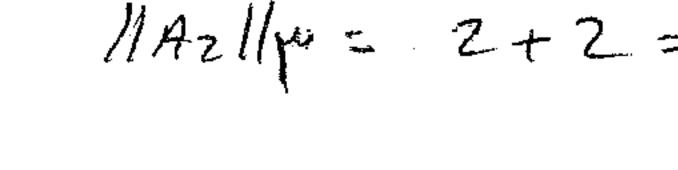












 $||A_2||_1 = 1 + 2 + 1 = 4$

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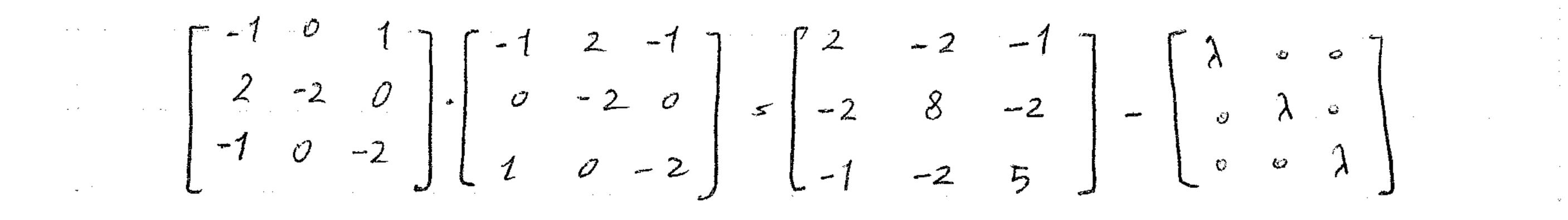
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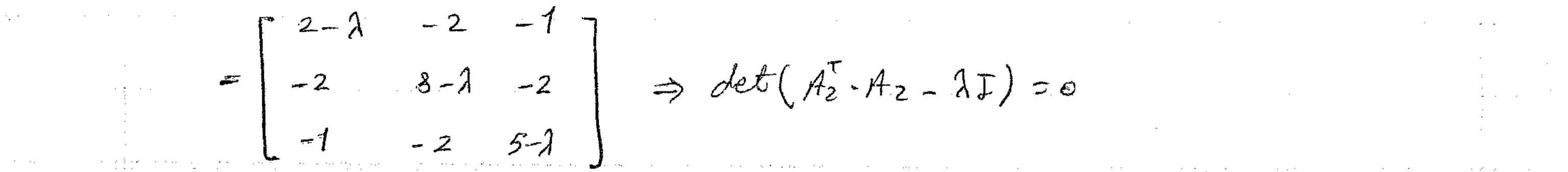
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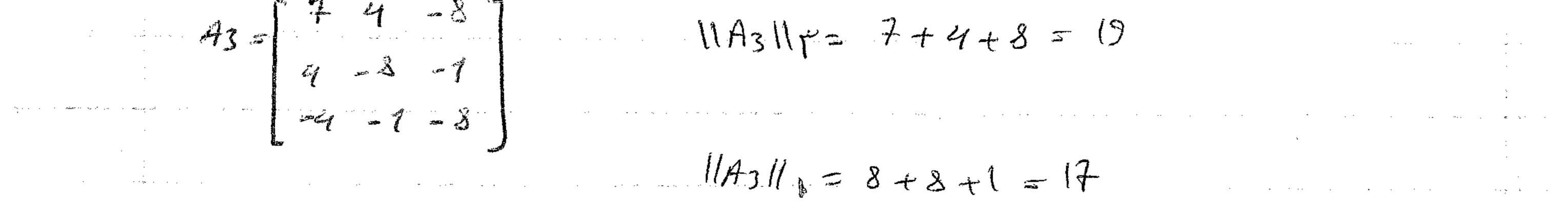
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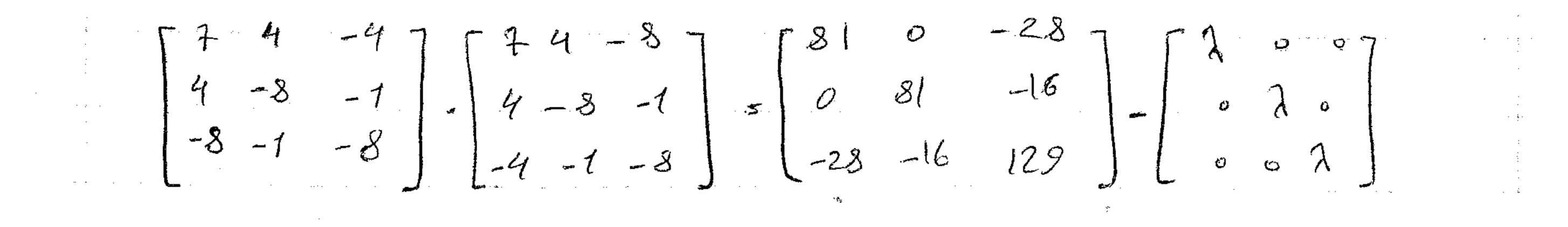


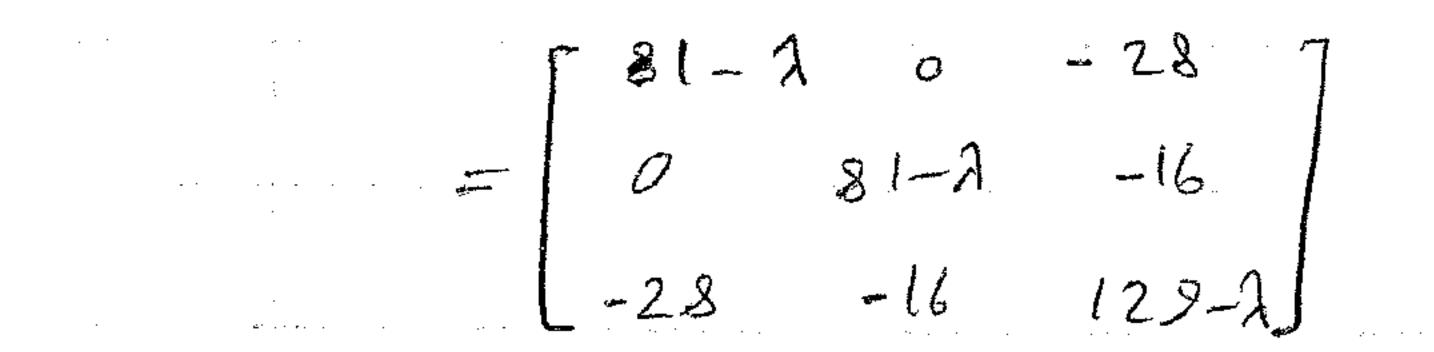


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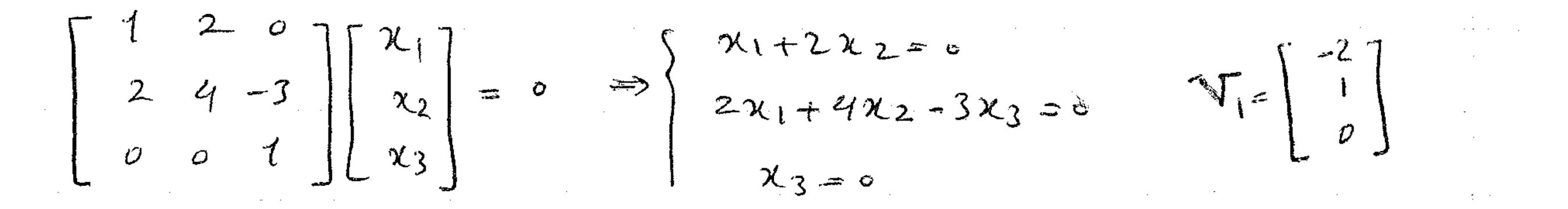
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 $A_2 = \begin{bmatrix} 0 & 2 & 2 \\ 1 & 0 & 6 \end{bmatrix}$

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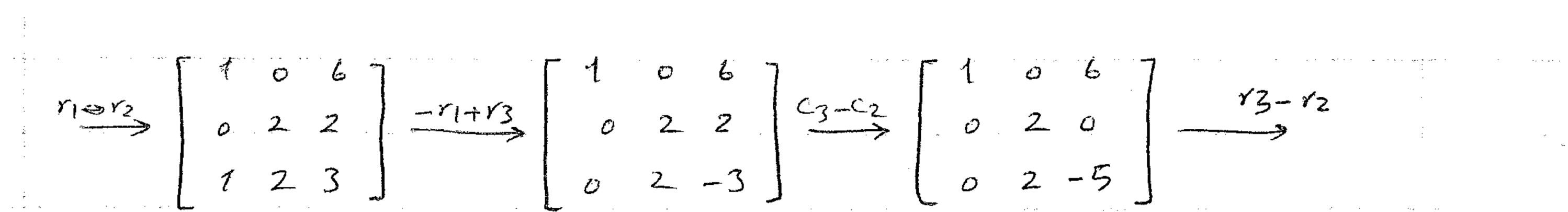
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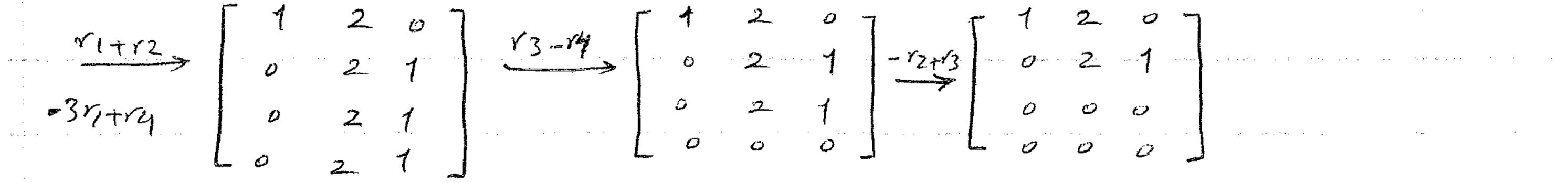
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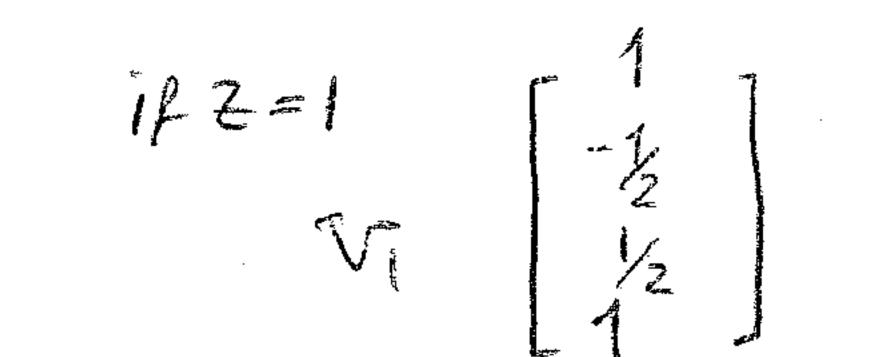
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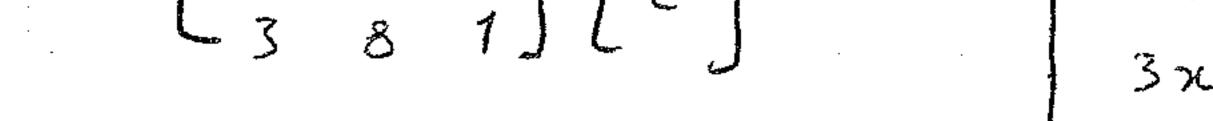
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 $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ \end{bmatrix} \xrightarrow{-2C_1+C_3} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -2C_2+C_3 \\ 0 & 0 & 0 \\ \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0$





 $A4 = \begin{bmatrix} 2 & 4 & 6 & 4 & 3 \\ 0 & 7 & 4 & 5 & 6 \\ 0 & 0 & 7 & 2 & 7 \end{bmatrix} \begin{cases} Rank(A4) = 3 \\ V(A4) = 5 - 3 \\ V(A4) = 5 - 3 \end{cases}$ det(Ag) = 0

 $V(A_4) = 5 - 3 = 2$

into the start and and

 $\begin{cases} 2x_1 - x_2 - x_3 = 2 \\ x_1 + 2x_2 + x_3 = 2 \\ 4x_1 - 7x_2 - 5x_3 = 2 \end{cases}$ (10-1)is (to -t).

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 $\begin{bmatrix} 2 & -1 & -1 & | & 2 \\ 1 & 2 & 1 & | & 2 \\ 4 & -7 & -5 & | & 2 \end{bmatrix} \longrightarrow \begin{bmatrix} 2 & -1 & -1 & | & 2 \\ 0 & 2 & -5 & 1 & -5 & | & 1 \\ 0 & 0 & 0 & | & 0 \end{bmatrix}$ The second se . --· · :

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 $if \chi_3 = 0 \Rightarrow \chi_2 = \frac{2}{5}, \chi_1 = \frac{6}{5}$



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 $\begin{cases} \chi_1 + \chi_2 + \chi_3 = 3 \\ \chi_1 + \chi_2 - \chi_3 = 1 \\ 3\chi_1 + 3\chi_2 - 5\chi_3 = 1 \end{cases}$

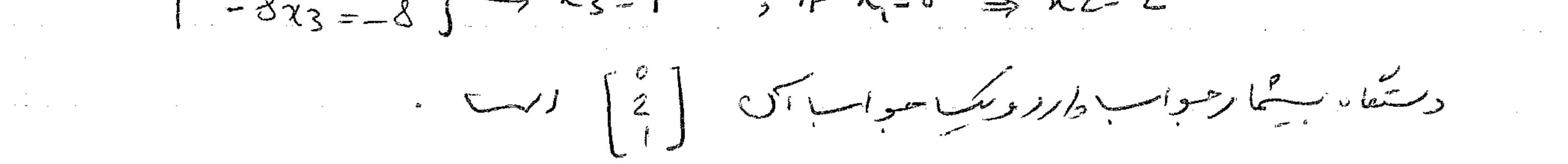
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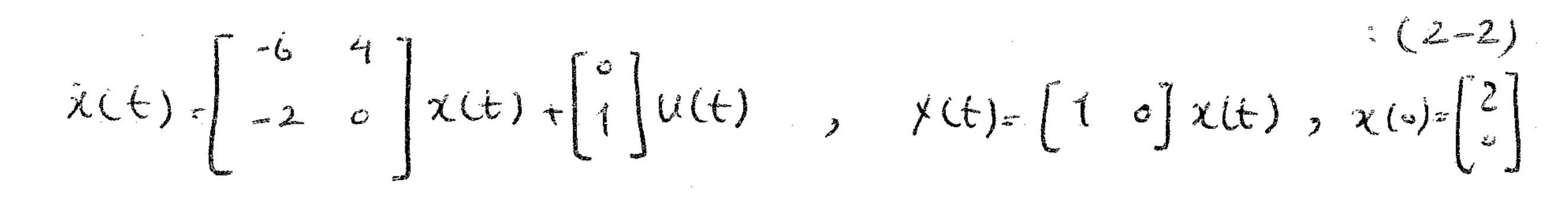
 $\begin{bmatrix} 1 & 1 & | & 3 \\ 1 & 1 & -1 & | & 1 \\ 3 & 3 & -5 & | & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 1 & 1 & | & 3 \\ 0 & 0 & 2 & | & -2 \\ 0 & 0 & -8 & | & -8 \end{bmatrix}$

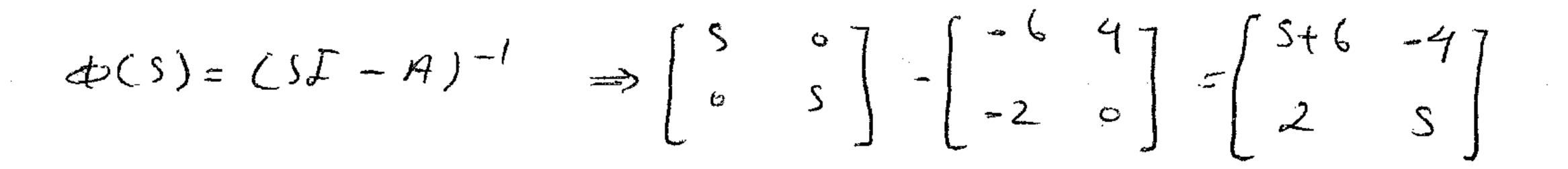
 $\Rightarrow \begin{bmatrix} \chi_1 + \chi_2 + \chi_3 = 3 \\ -2\chi_3 = -2 \\ -8\chi_3 = -8 \end{bmatrix} \Rightarrow \chi_3 = 1 , i \not = \chi_1 = 0 \Rightarrow \chi_2 = 2$

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 $\frac{1}{S(S+6)+8} \begin{bmatrix} S & 4 \\ -2 & S+6 \end{bmatrix} = \begin{bmatrix} \frac{3}{A} & \frac{4}{A} \\ -\frac{2}{A} & \frac{5+6}{A} \end{bmatrix} = \Phi(S)$

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 $\chi(S) = \phi(S) \cdot \chi(0) + \phi(S) \cdot B \cdot U(S)$

 $\chi(s) = \begin{bmatrix} -\frac{2}{A} & \frac{4}{A} \end{bmatrix} \begin{bmatrix} 2\\ -\frac{2}{A} & \frac{5+6}{A} \end{bmatrix} \begin{bmatrix} 0\\ 1 \end{bmatrix} \times \frac{1}{S}$

 $\chi(s) = \begin{bmatrix} 2s^2 + 4 \\ \overline{s(s+4)(s+2)} \\ -4s + 6 \end{bmatrix}$

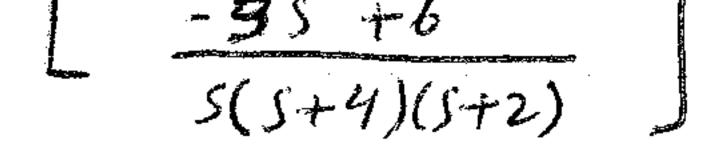
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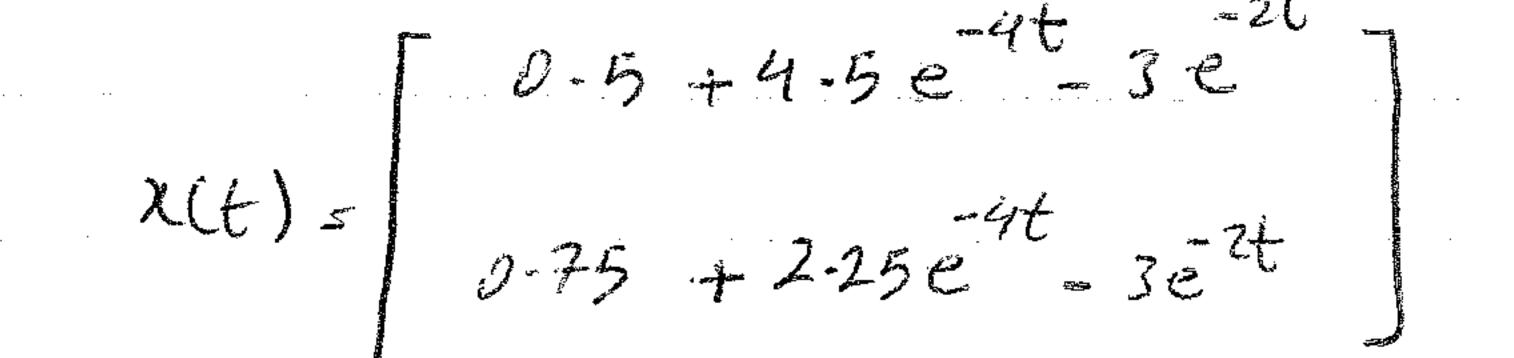
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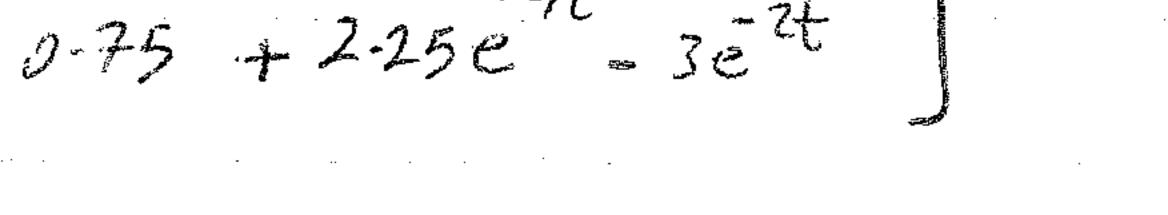
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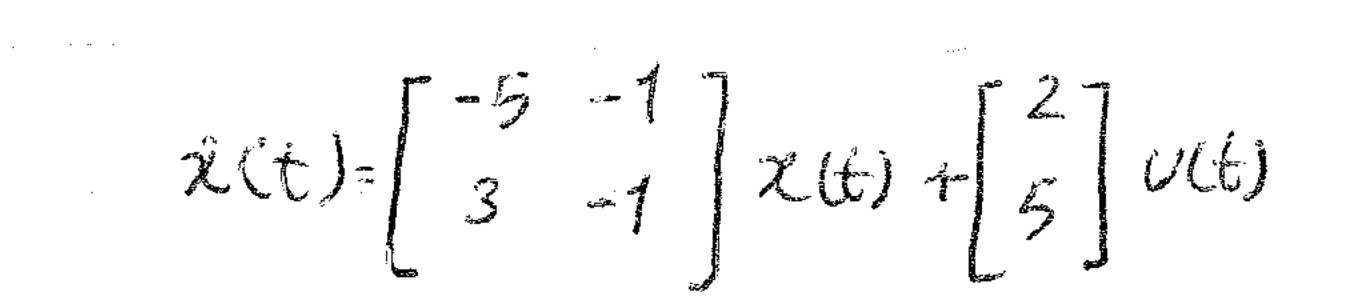
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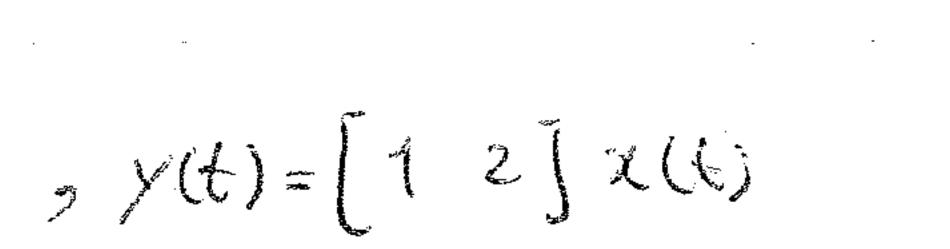
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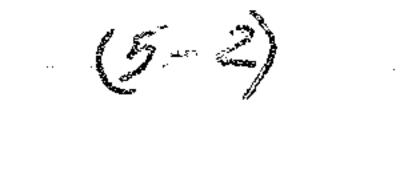


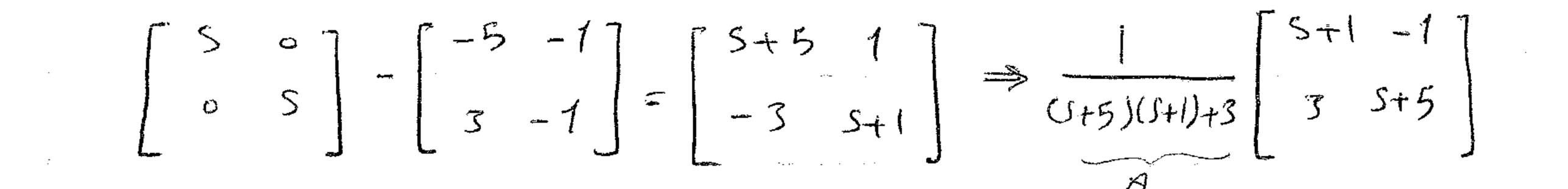
 $\frac{y(s)}{u(s)} = C(SI - A)^{-1}B + D$

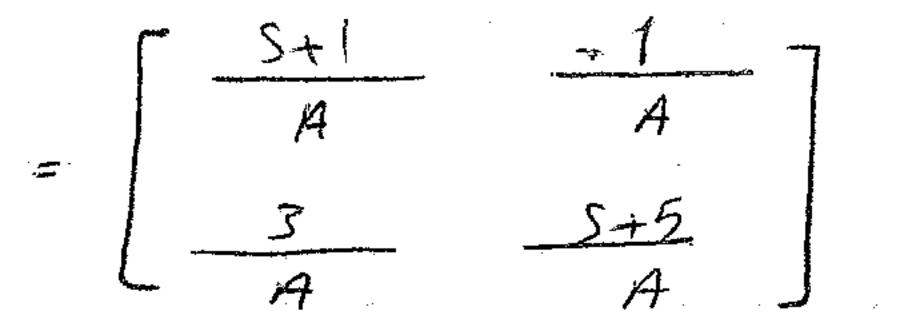


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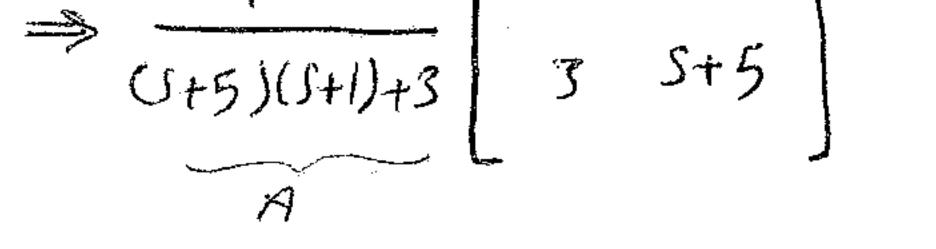
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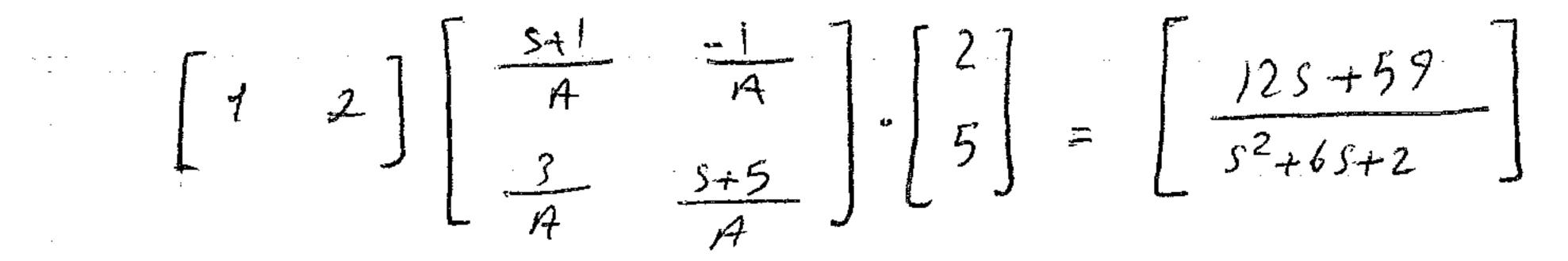








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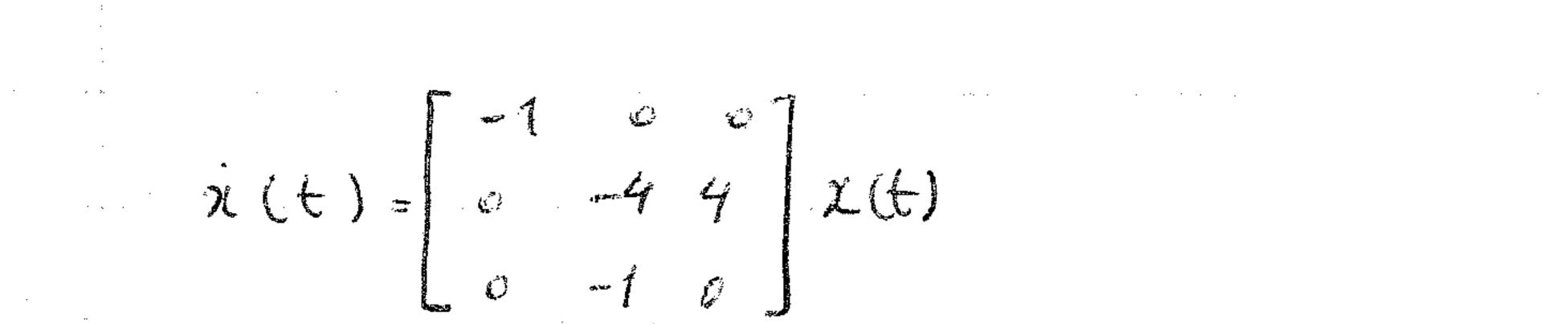
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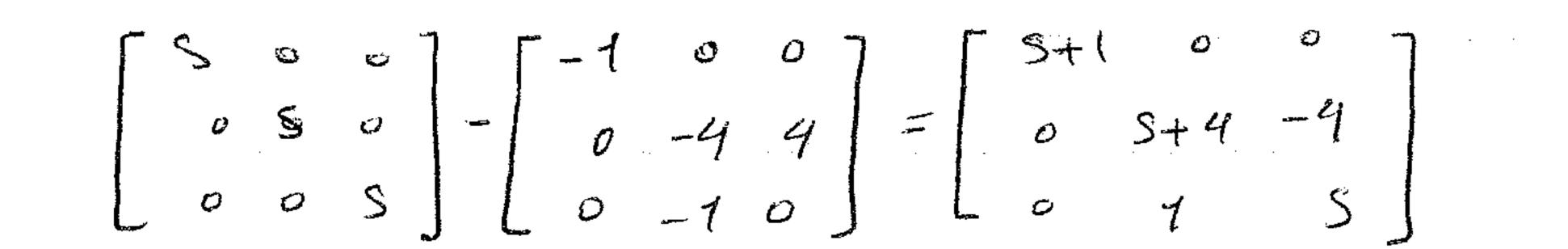


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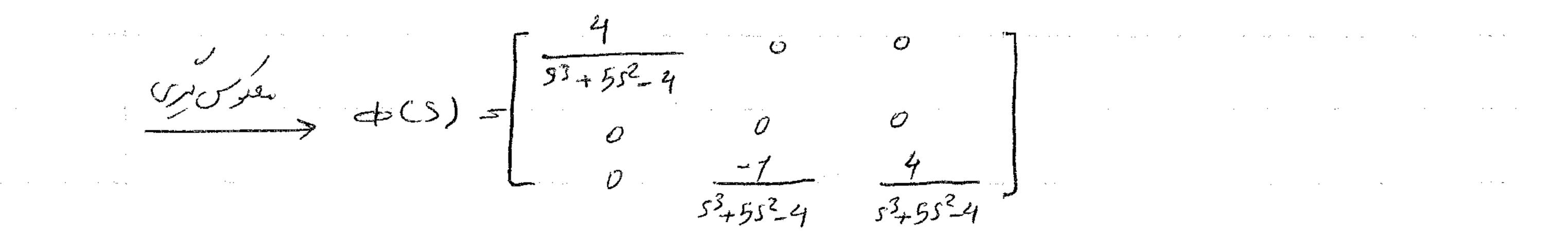


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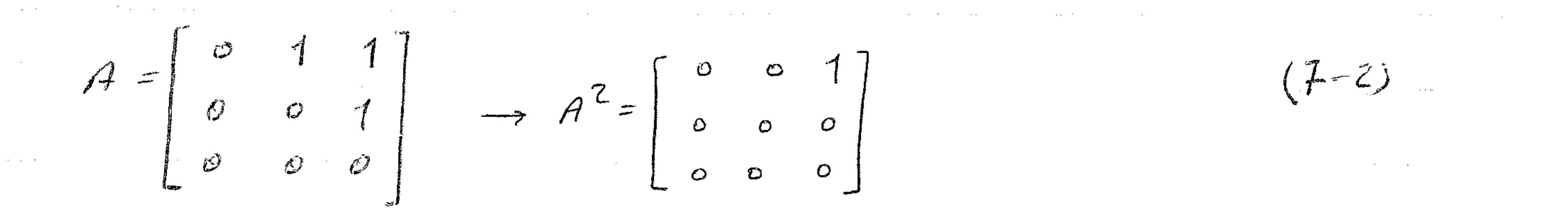
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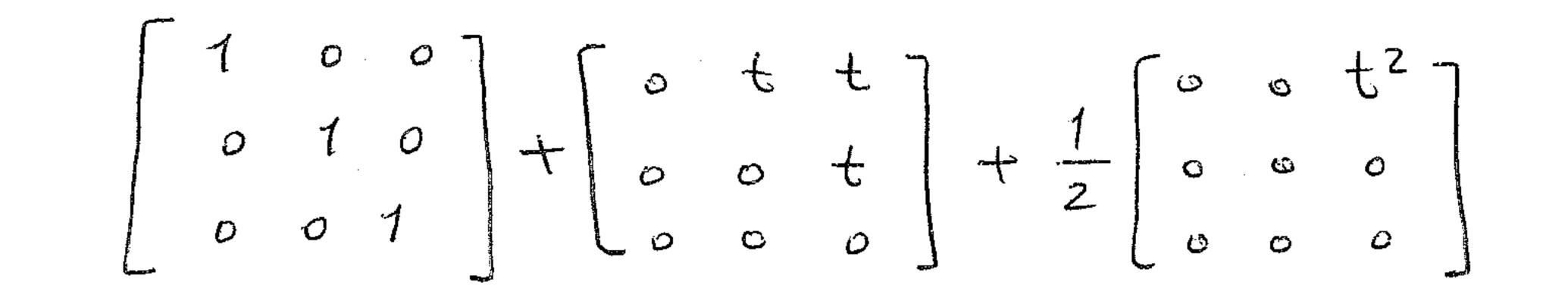
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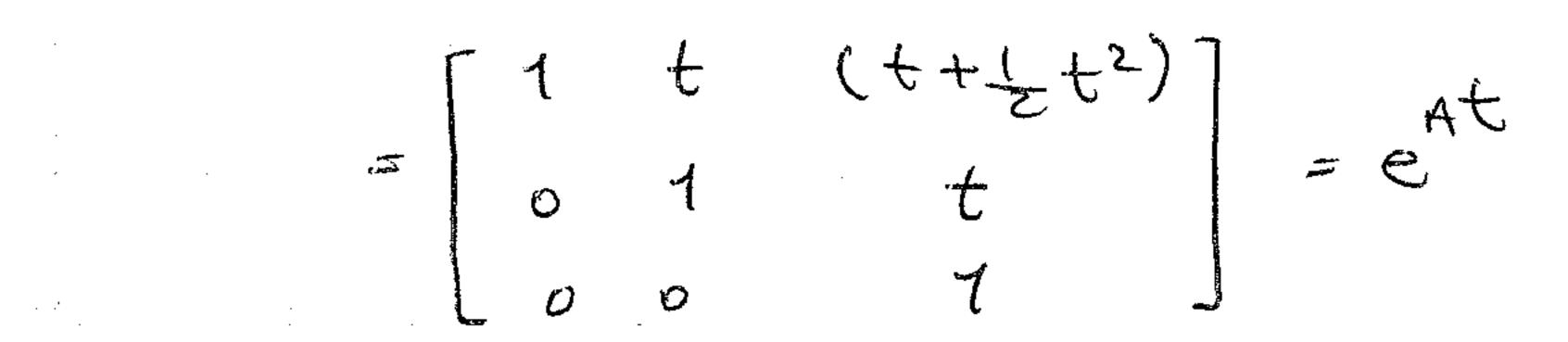
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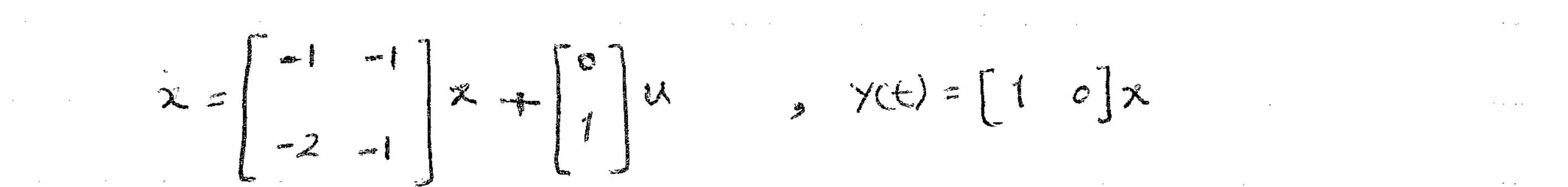
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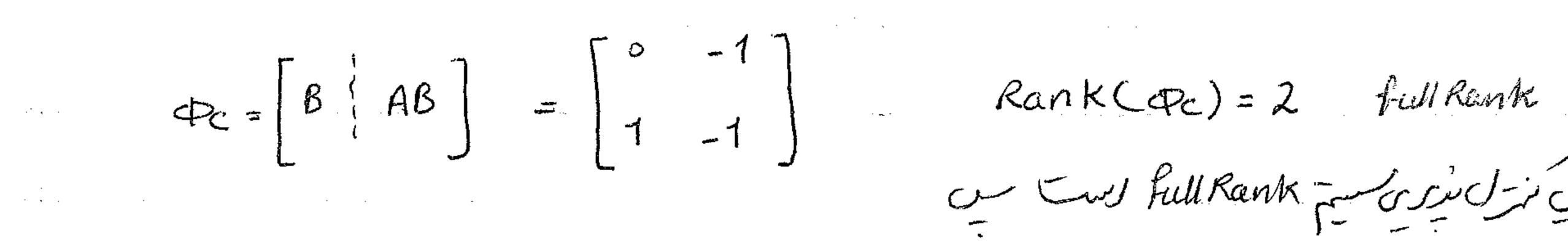
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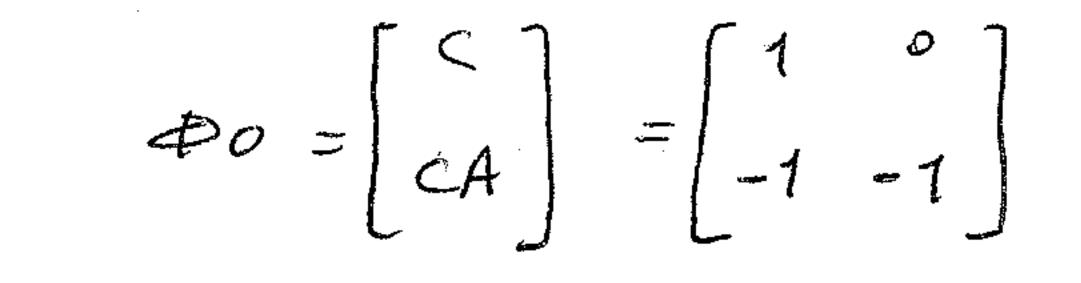
. (2-3) مترك مذين درويت مذين مسترواده شره ، معادلات دار في زيرا درار كمد





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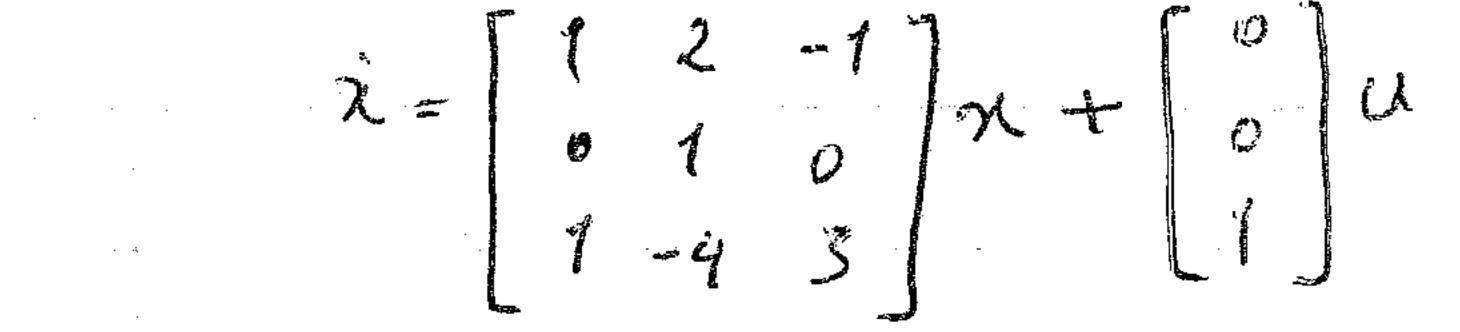
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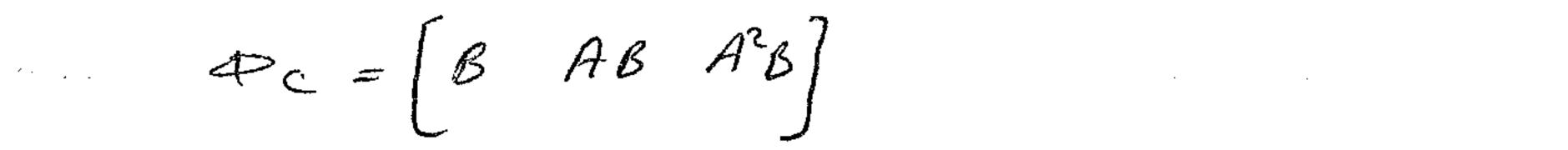
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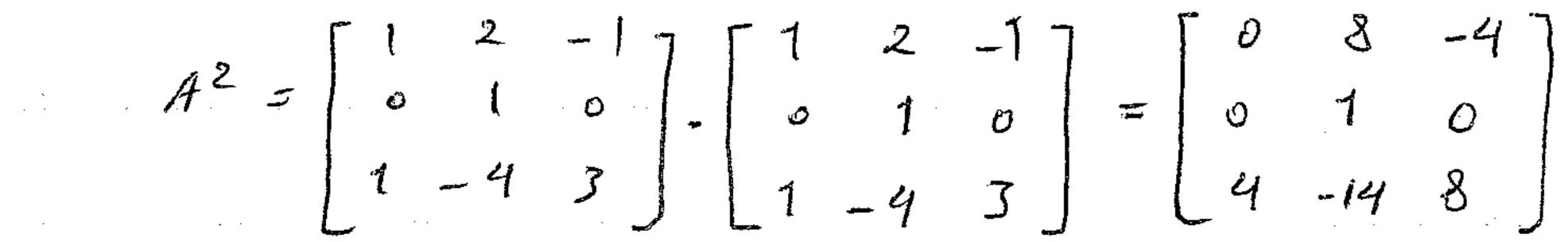
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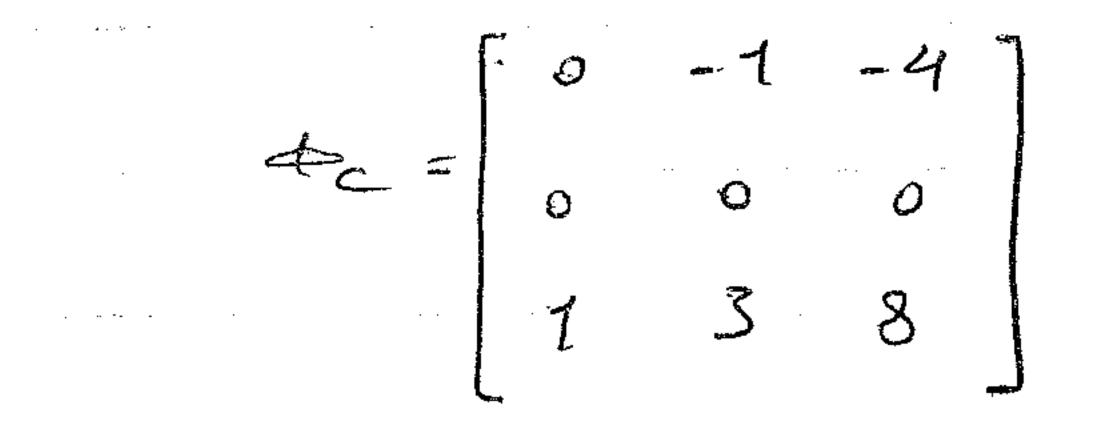
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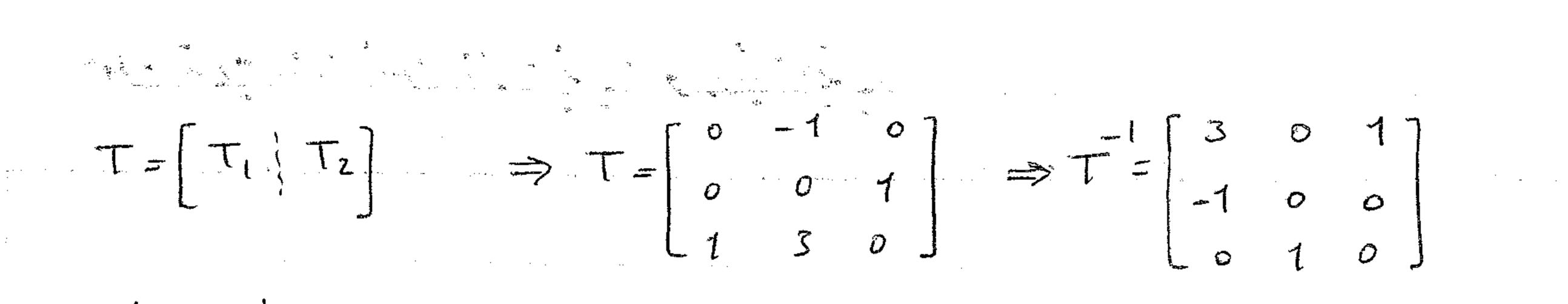


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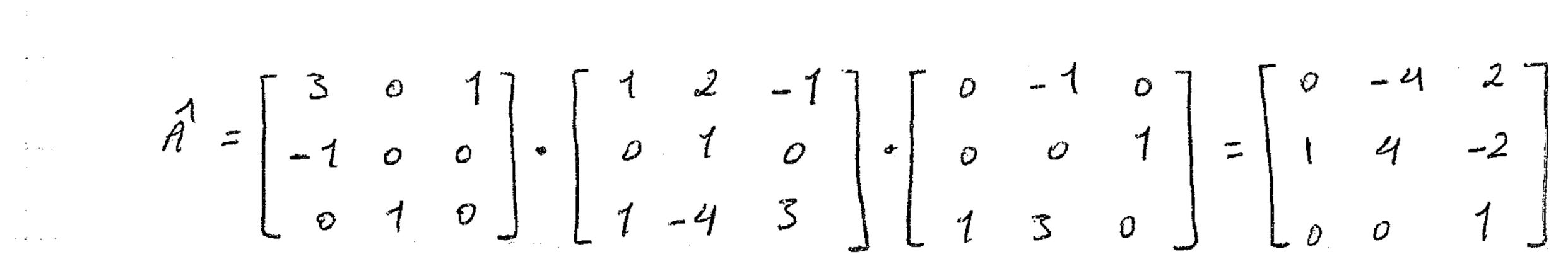
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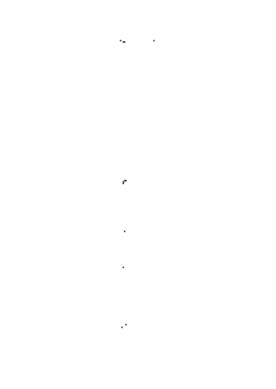
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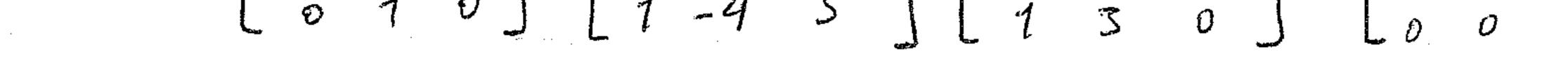




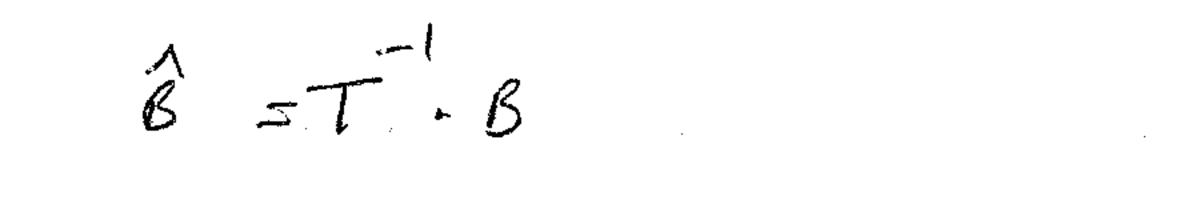


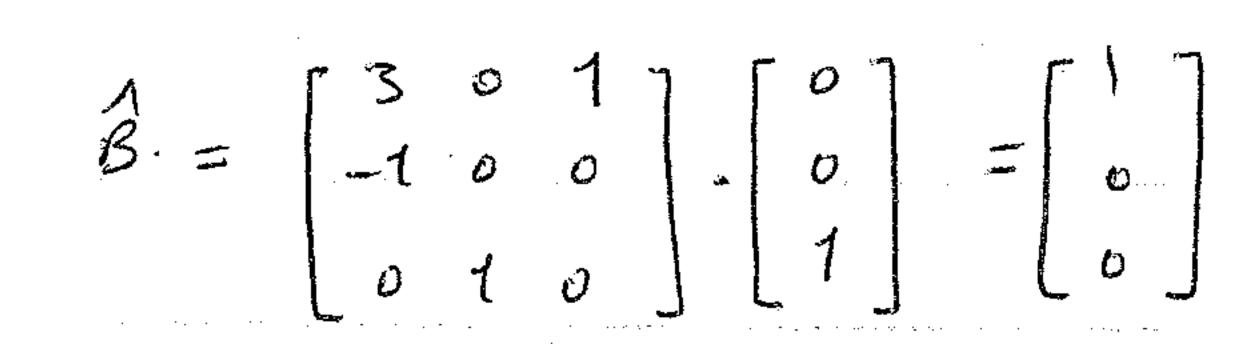


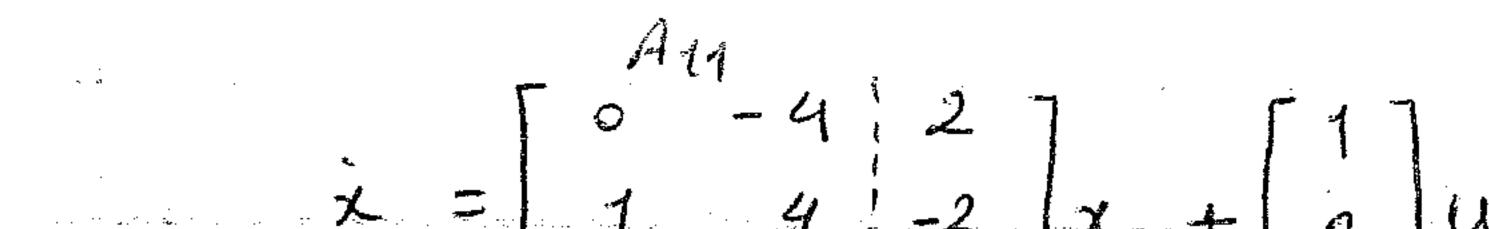
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من كانوشال مترك يوم مورك برياس :

 $\dot{x} = \begin{bmatrix} 0 & -4 & 2 \\ 1 & 4 & -2 \\ 0 & 0 & 1 \end{bmatrix} \times \begin{pmatrix} 1 \\ 0 \\ 0 \end{bmatrix} u$ A_{23} مركزل كالبركسي معدار مرق ماترس جم عين $(\lambda_{12}=2)$ $(\lambda_{22}=2)$ $(\lambda_{22}=2)$ $(\lambda_{22}=2)$ $(\lambda_{22}=2)$ $(\lambda_{22}=2)$ $(\lambda_{22}=2)$ $(\lambda_{22}=2)$

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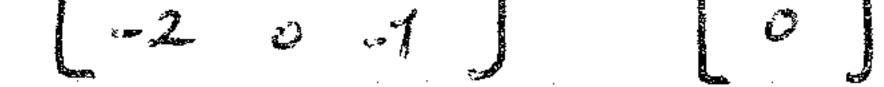
 $\dot{x} = \begin{bmatrix} 1 & 0 & 0 \\ x = \begin{bmatrix} 1 & -2 & 1 \\ -2 & 0 & -1 \end{bmatrix} x + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$

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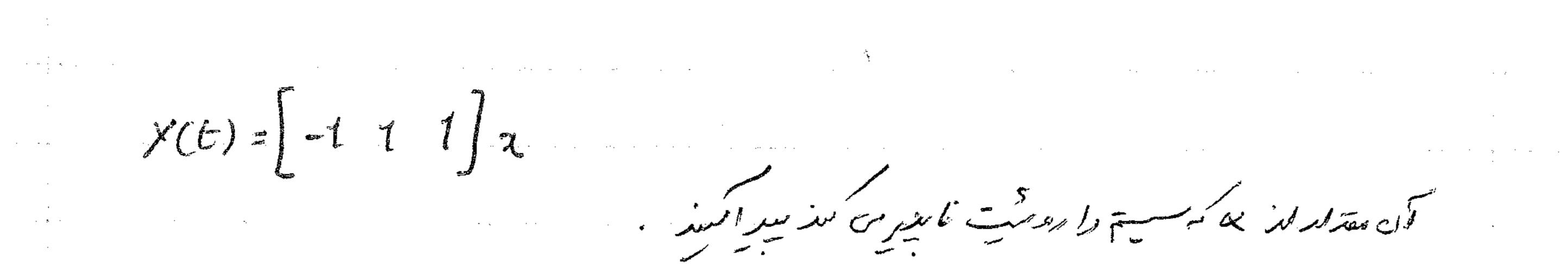
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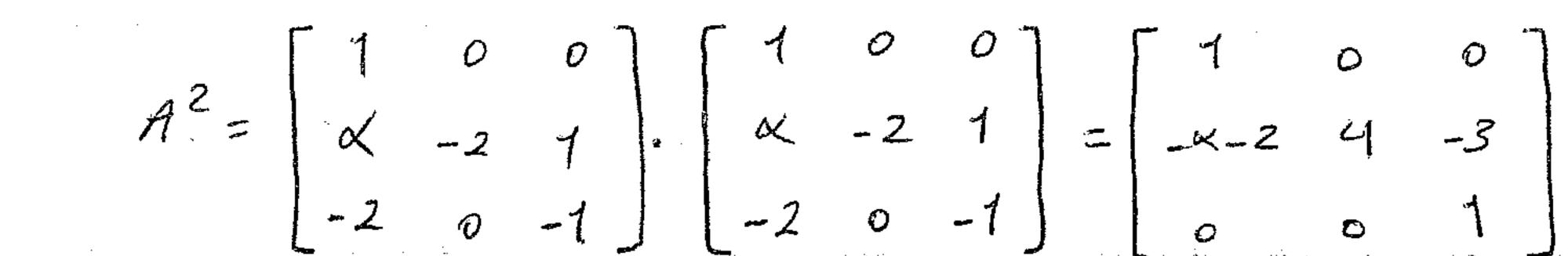
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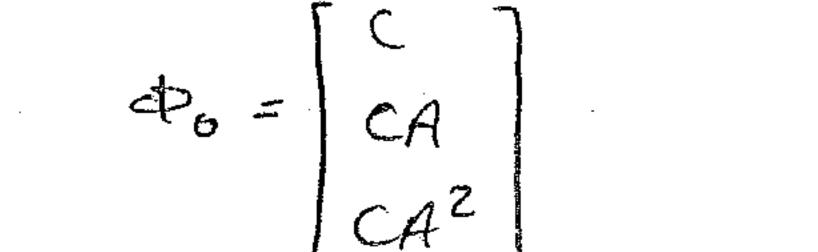
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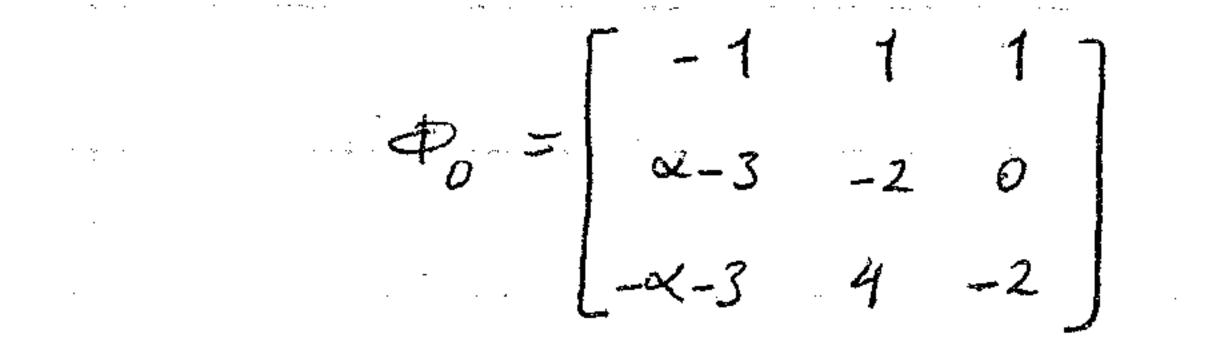


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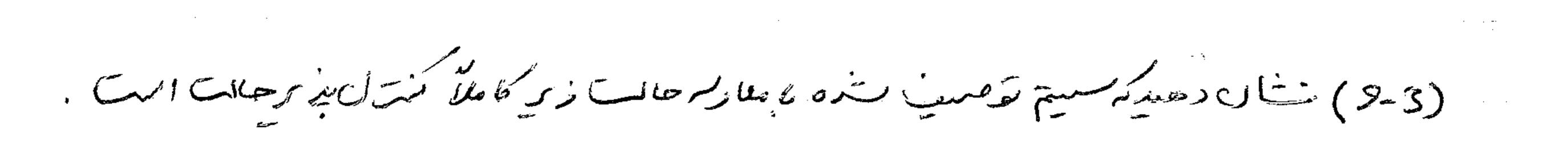


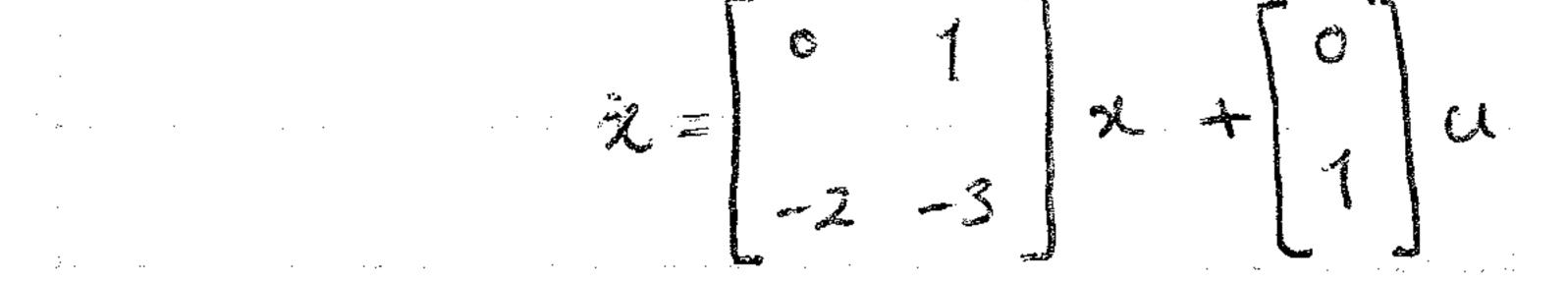
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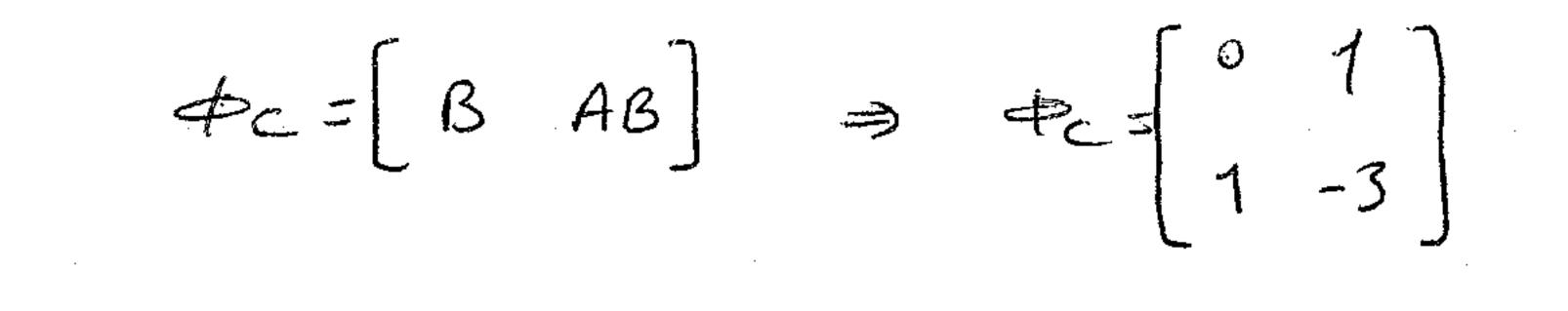
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(2-21) مستم زرا در تظریر

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مُرْك منيم كال جالب ل براي متادير مختلف ٩ وطوى براي كن . برای اس مسیح زران مذیر مال حالت ، شرمط اکفر البردون (تک بود عران) را مرازده و معل متناطر الن سول در ماترس ۵ مد ناصف تر رضر در ماترس ۵ م اهسا (در ...

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(3-3)) مادل مي عنبر (16-3) $\dot{x} = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \times + \begin{bmatrix} 1 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix} \times + \begin{bmatrix} 1 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix} \times + \begin{bmatrix} 1 \\ 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ من مشال شرب

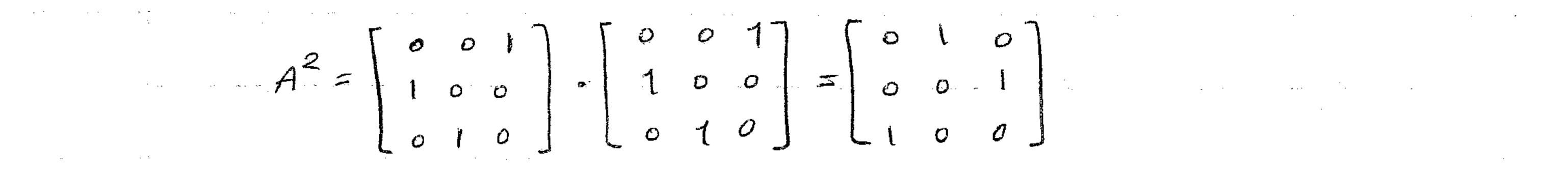
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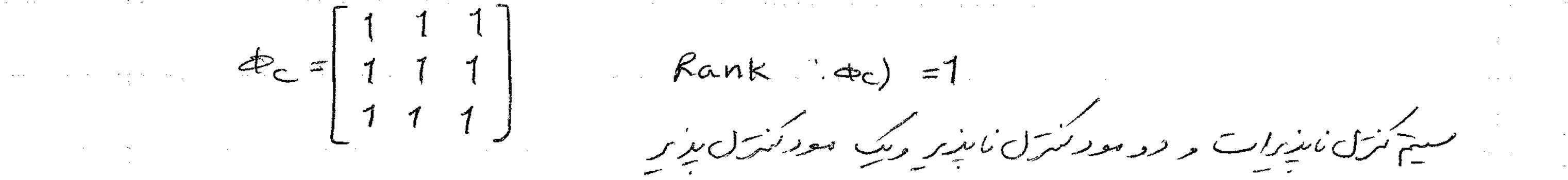
الف) بوارها مي ترزيعة مى تترك بير سيترا App مى كتتر تعين كسدِ

ب) ، کرتری بدارهای قرن شره در (ای) وقت بدای منای این این مادی مادی لاجن منت منيس مرد ، مودهاى مكل مني ورك كامير مستراشا ماي كمند.

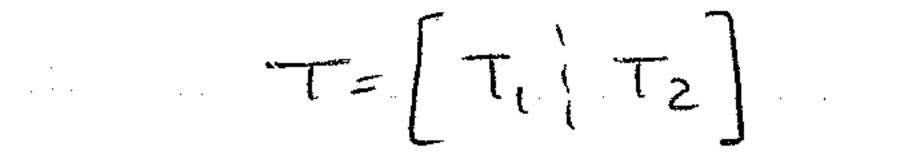
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 $\oint c = \begin{bmatrix} B & AB & A^2B \end{bmatrix}$ · . .

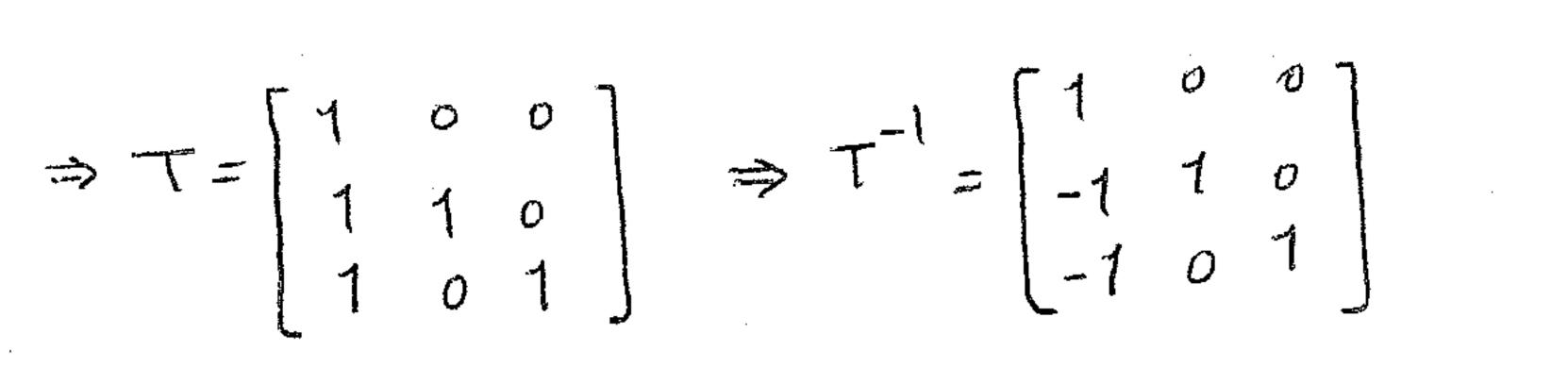




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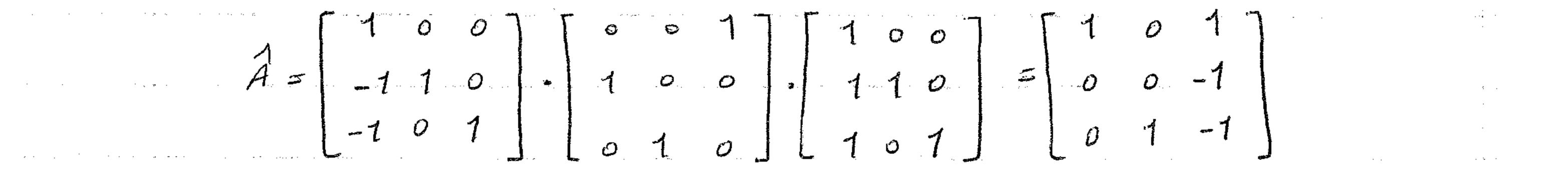


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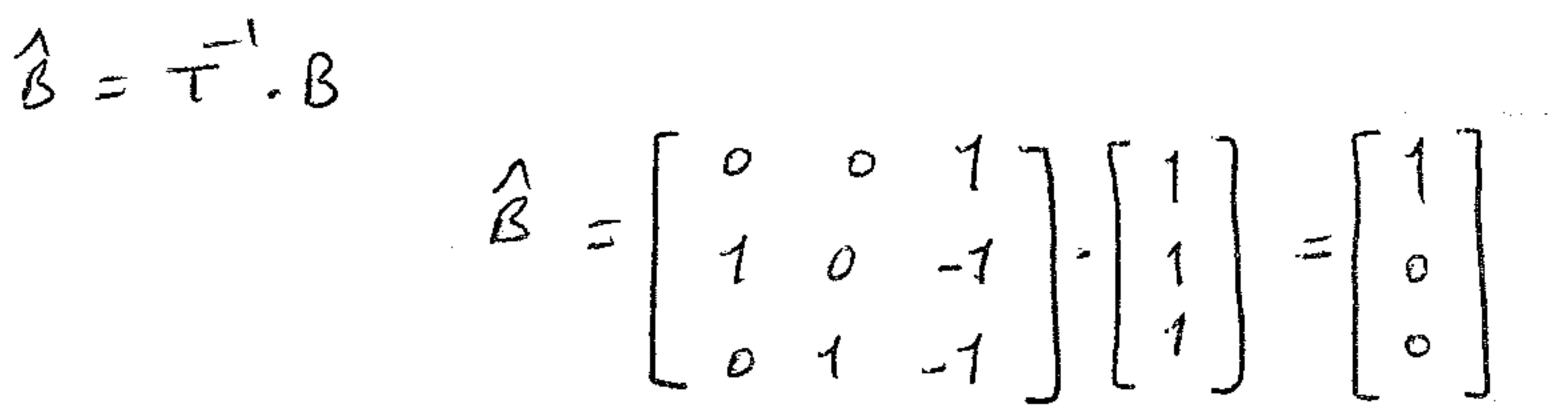
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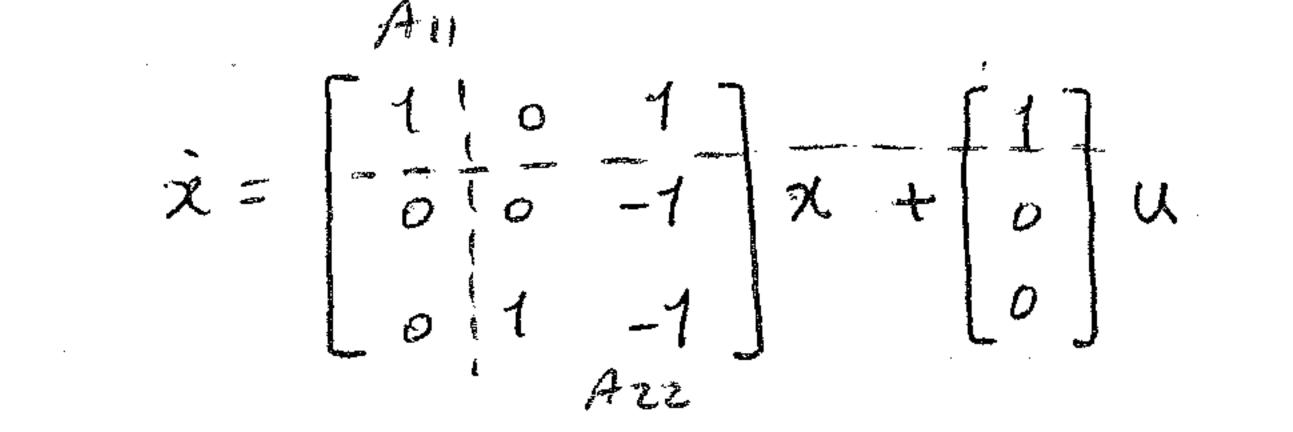
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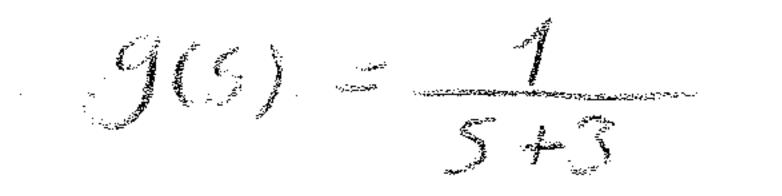
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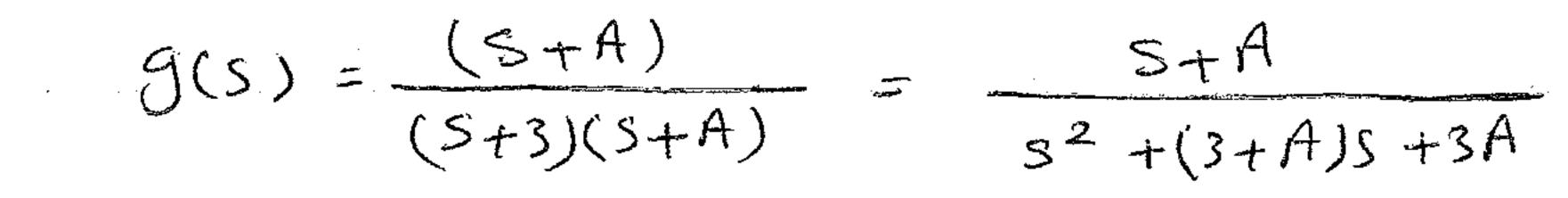
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رف) موجن مرك يرويد تايير سراريد.

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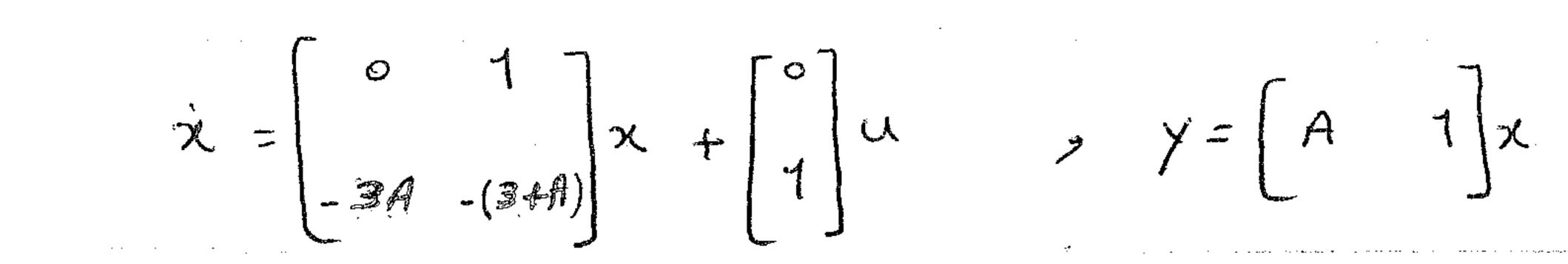
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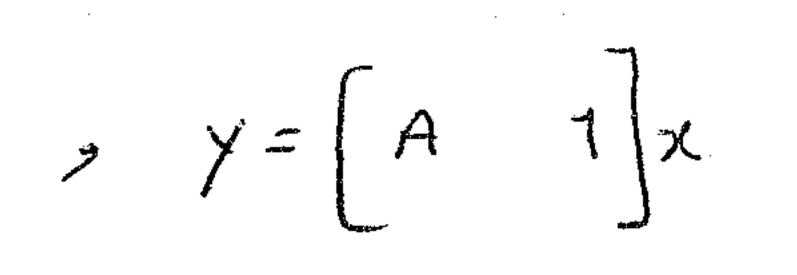
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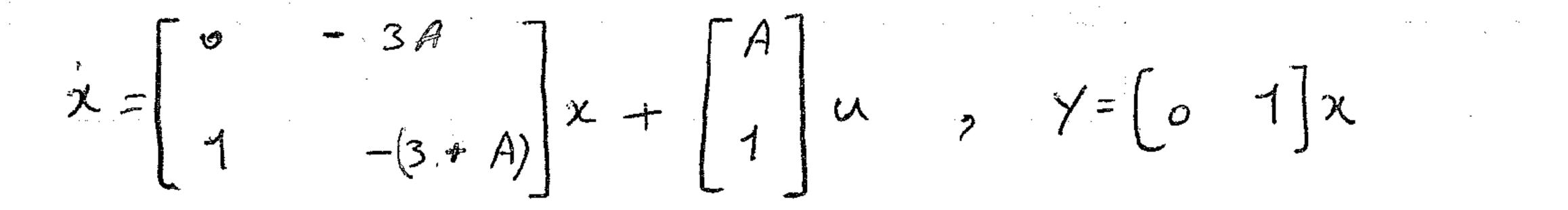
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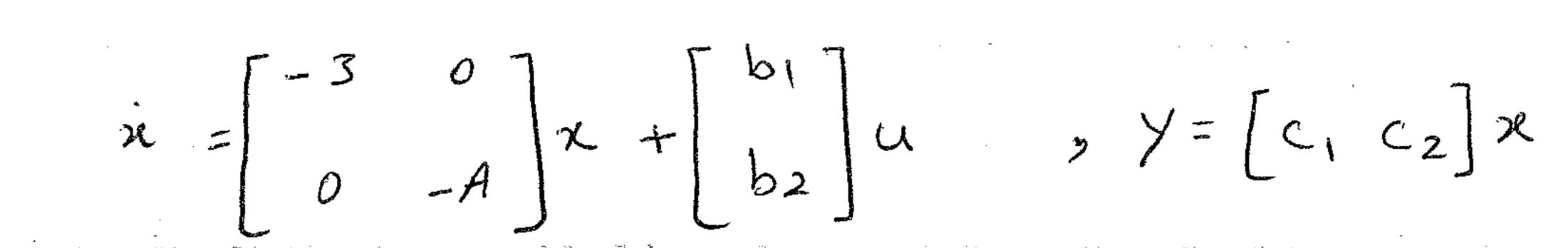


ب) م محق انرل ماني د وروست مر سراميد . محقق نترك ندير ورونت مذير المطان تحقق الاست



ج) تحقق مترل ماني مرومي ماني ميرميد .

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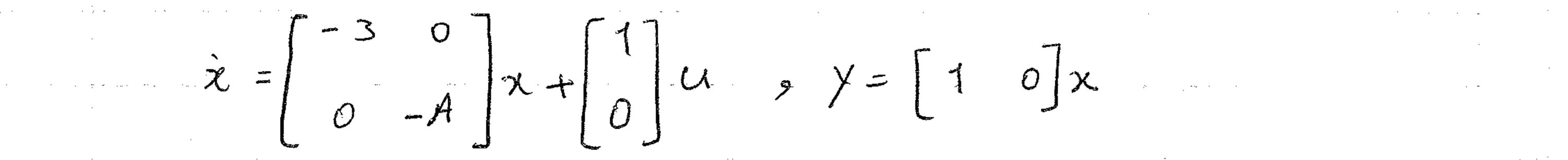
 $\frac{S+A}{(S+3)(S+A)} = \frac{1}{S+3} + \frac{0}{S+A}$

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$$b_i c_i = k_i \Rightarrow b_i c_i = 1 \Rightarrow b_i = c_i = 1$$

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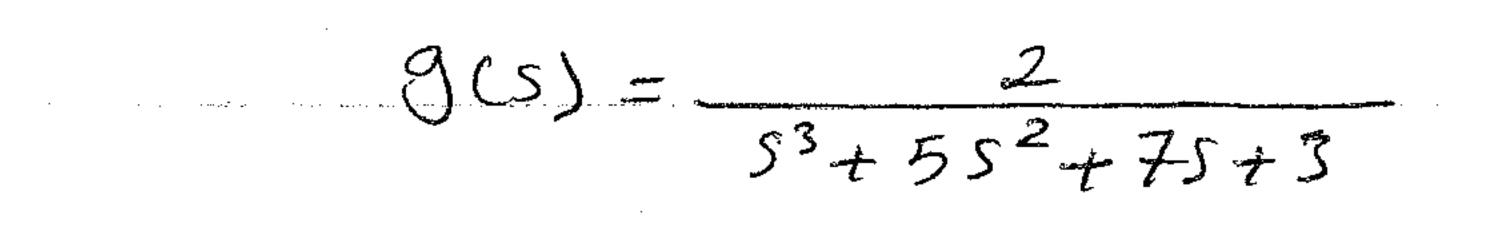
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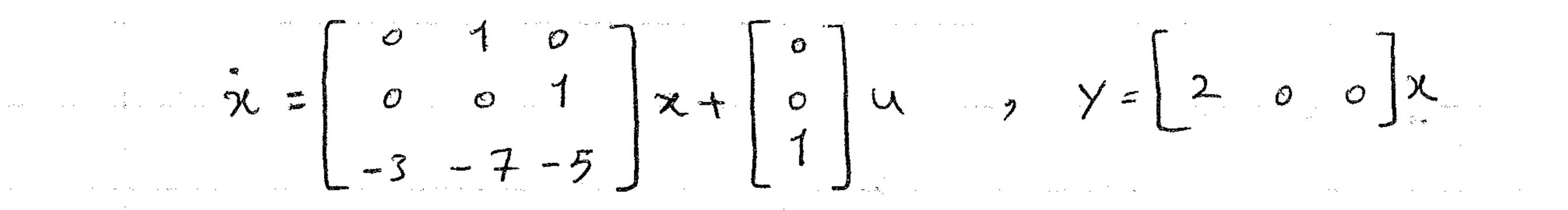
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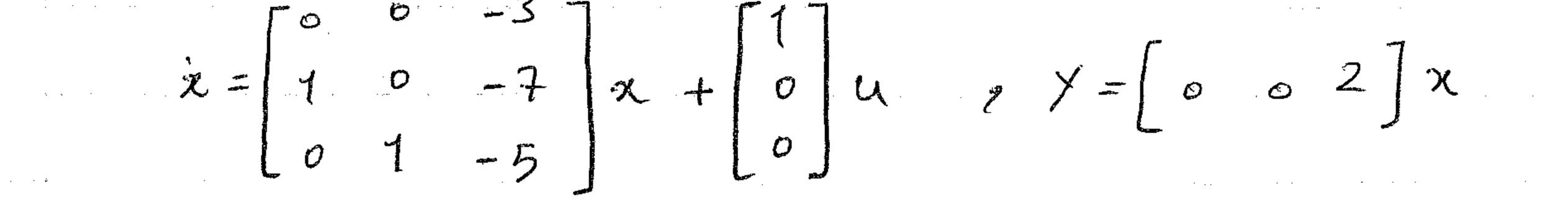
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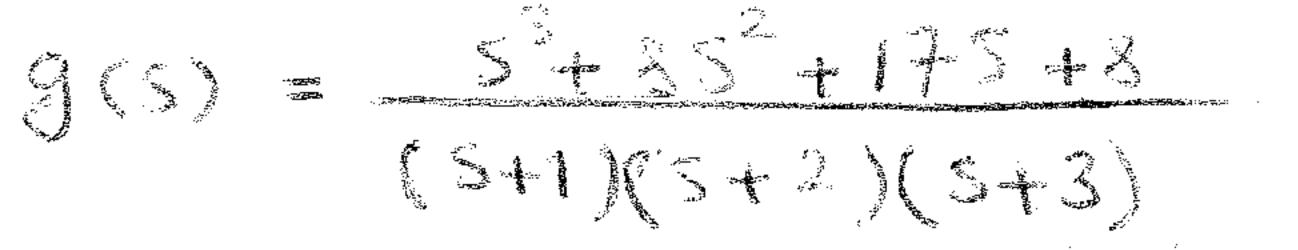
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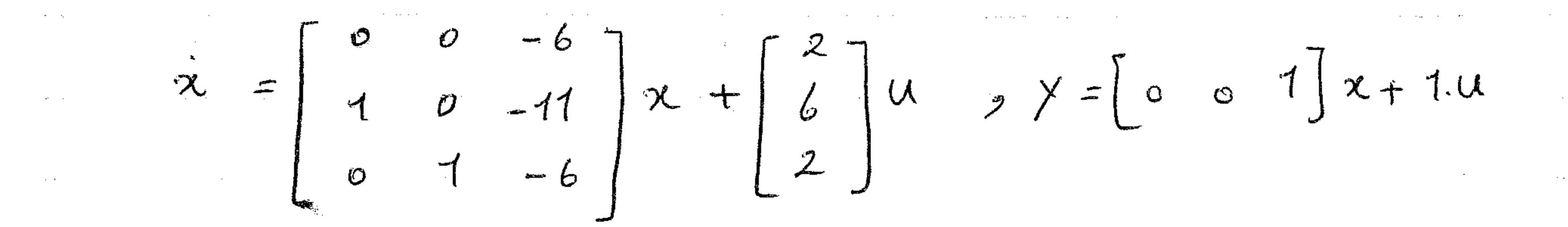
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 $g(s) = \frac{s^3 + 8s^2 + 17s + 8}{s^3 + 6s^2 + 11s + 6}$

· · · · · · $g(s) = 1 + \frac{2s^2 + 6s + 2}{s^3 + 6s^2 + 4s + 6}$ i Lind Gird Ges (

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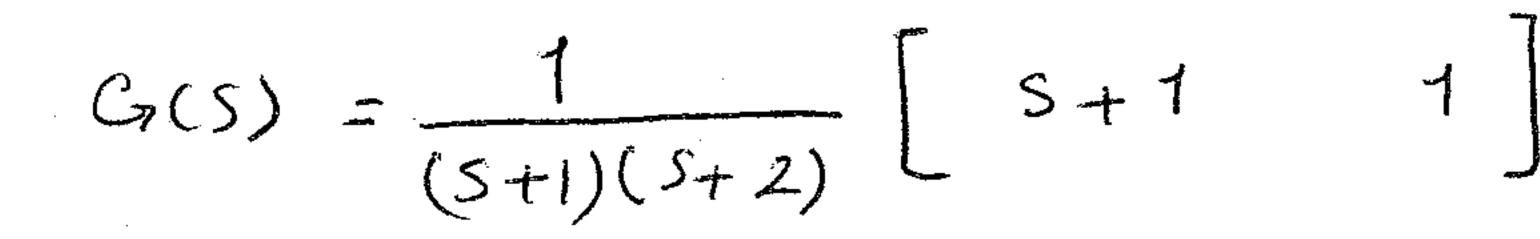
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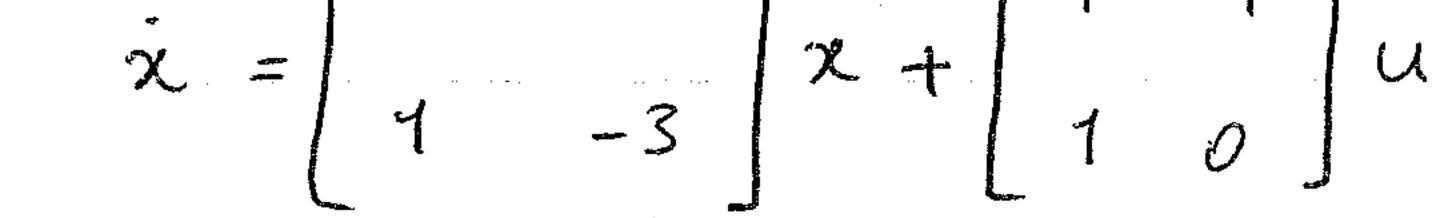
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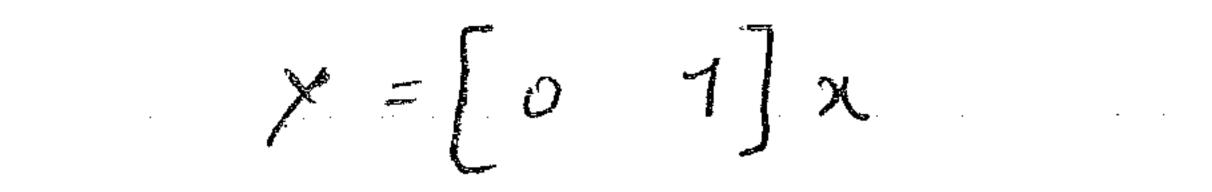
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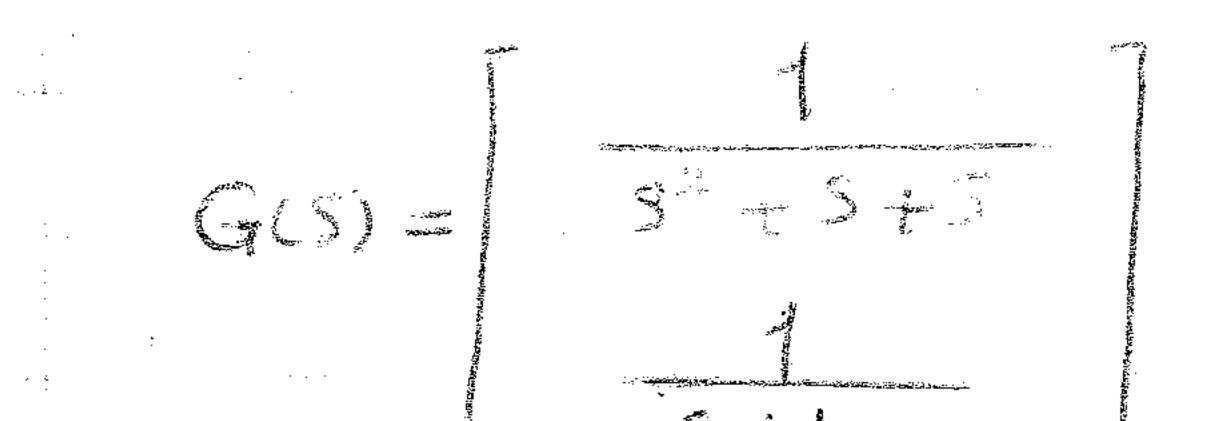
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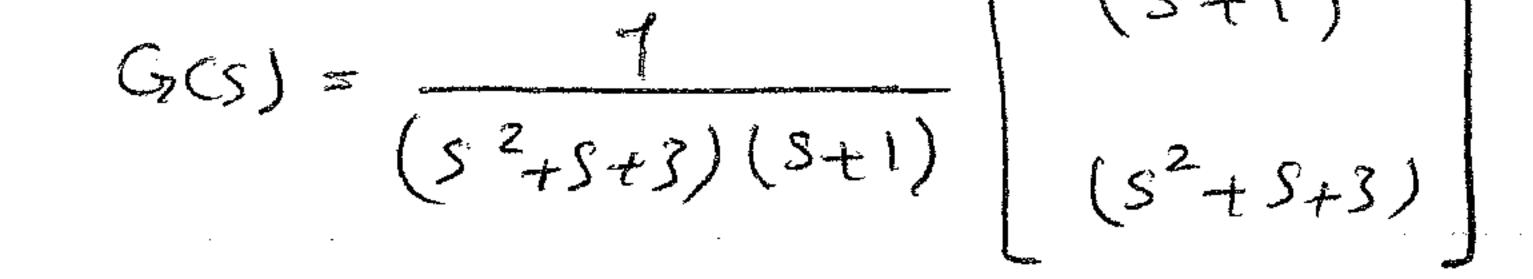


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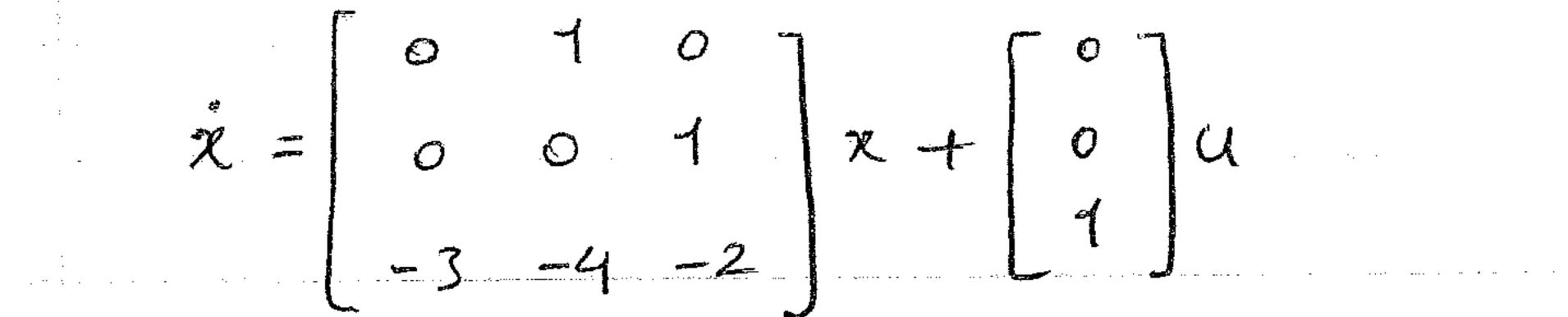
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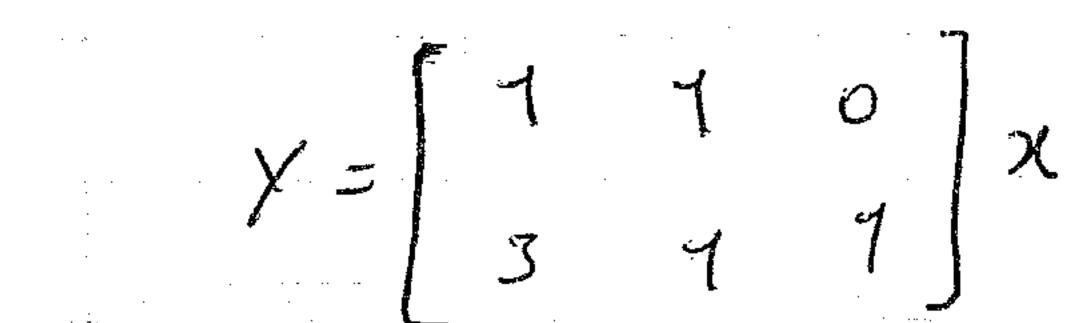
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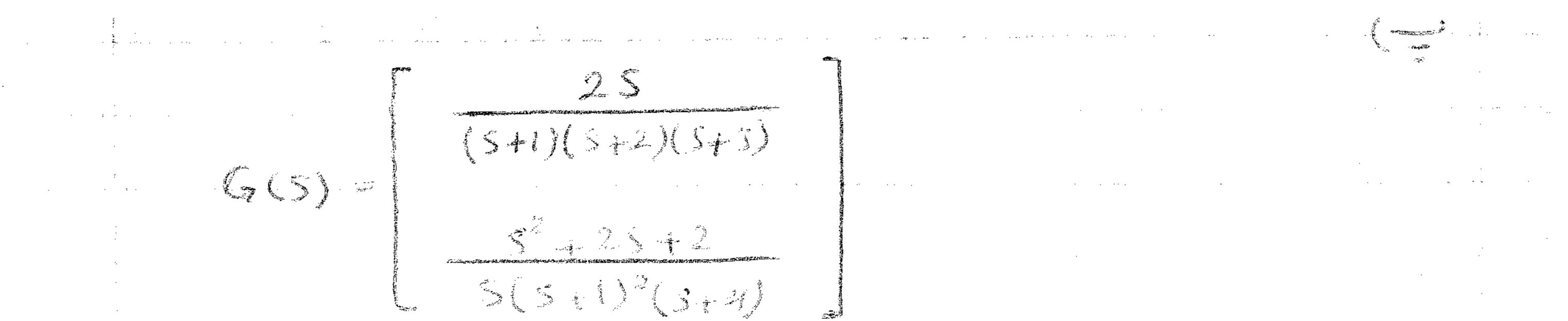
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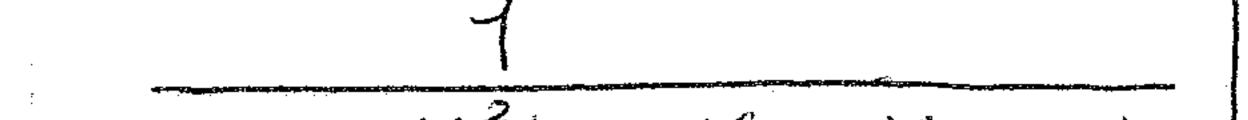




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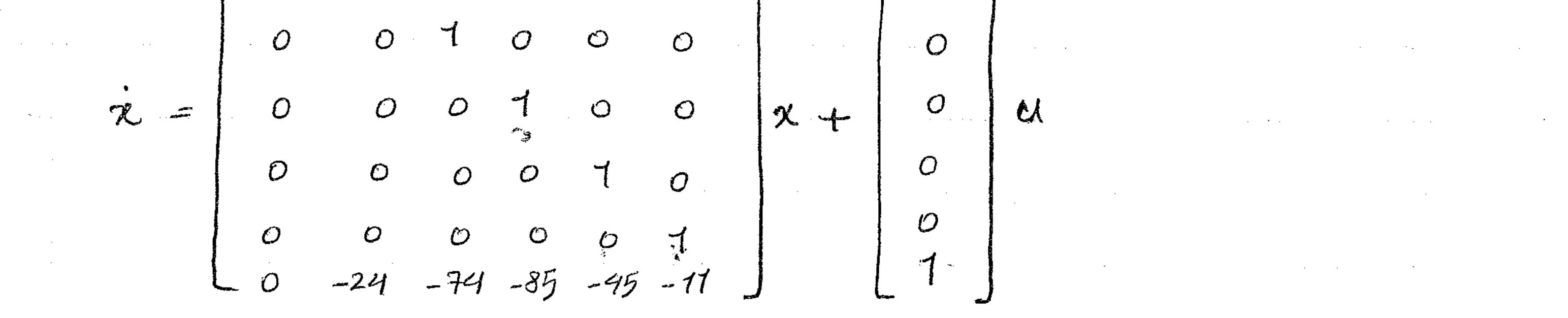
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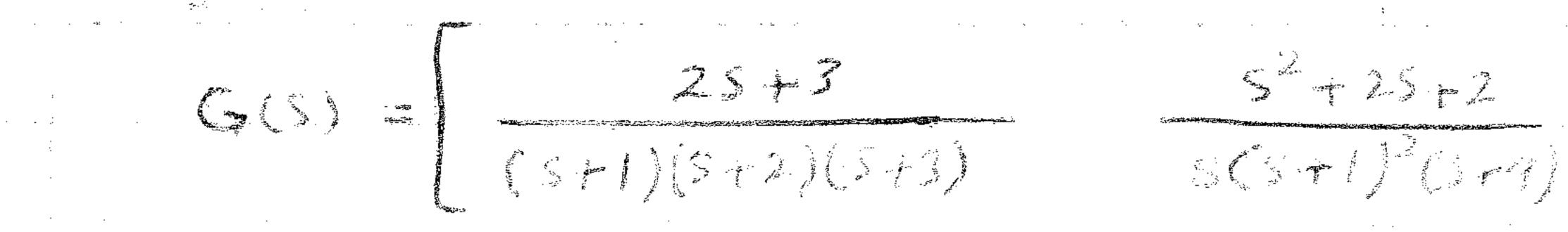
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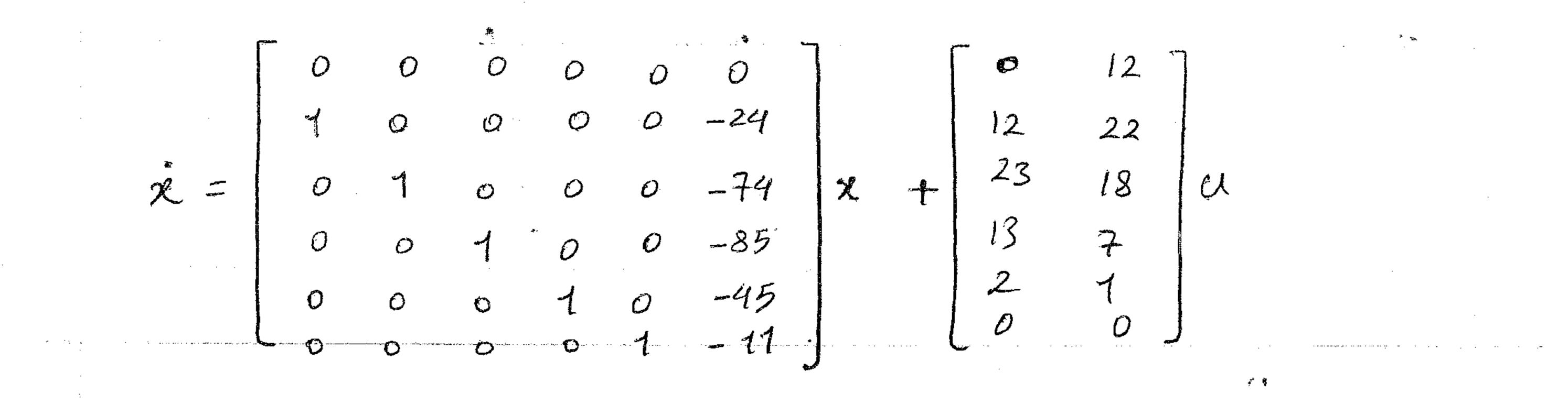
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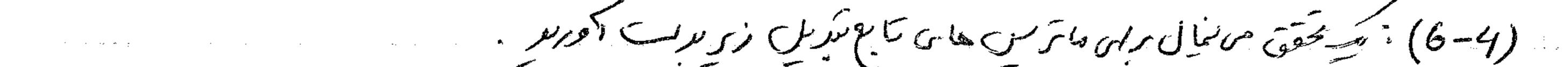
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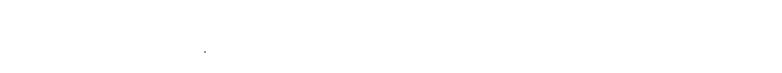


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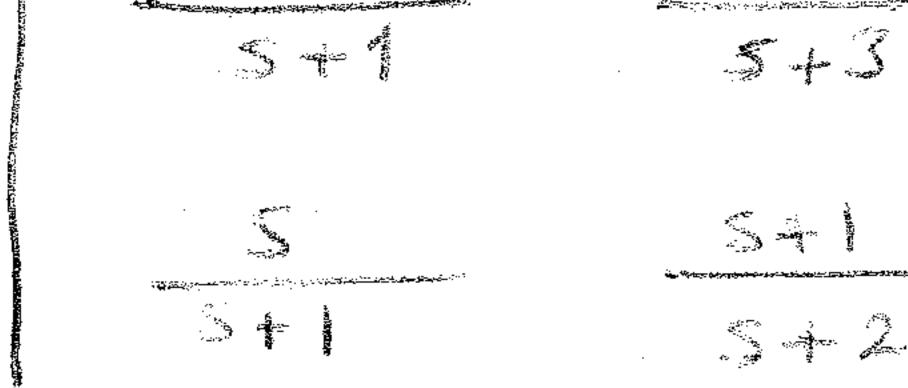


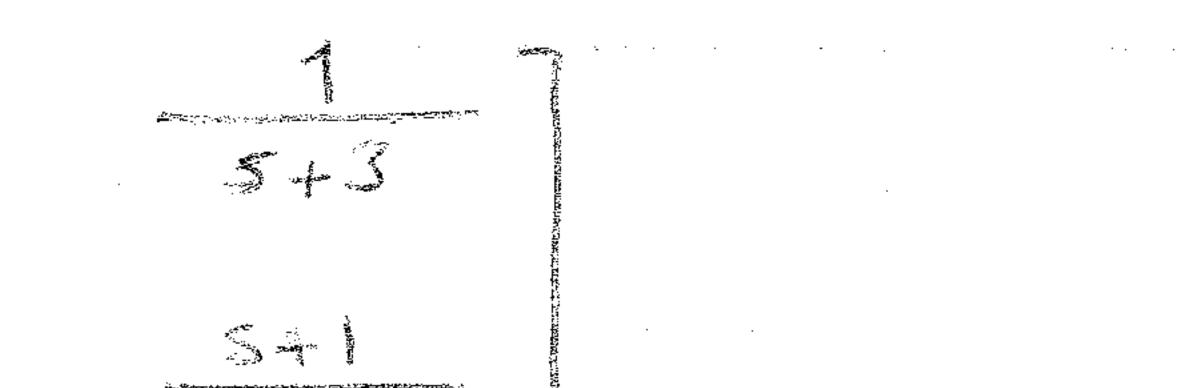
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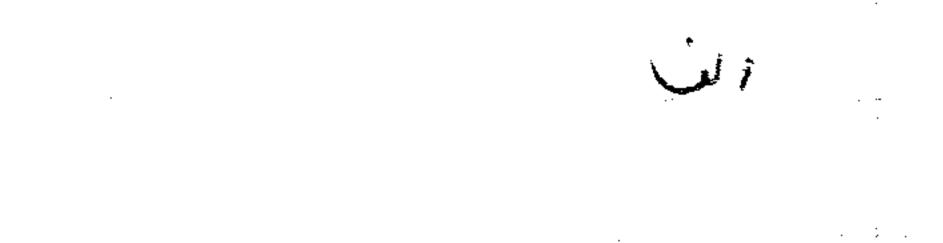
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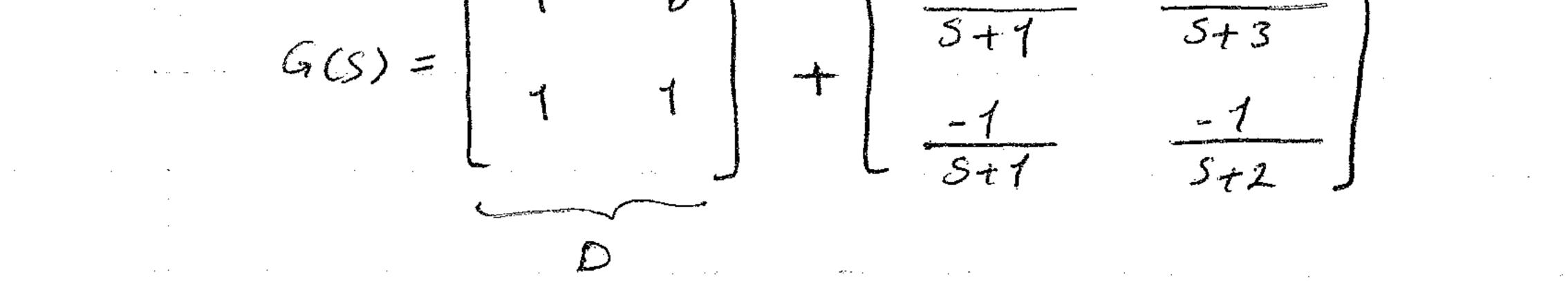
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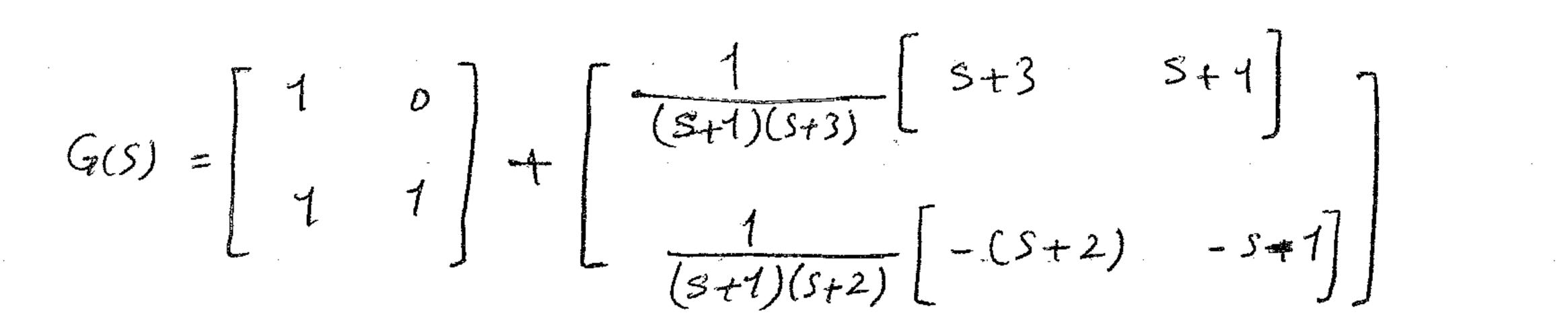
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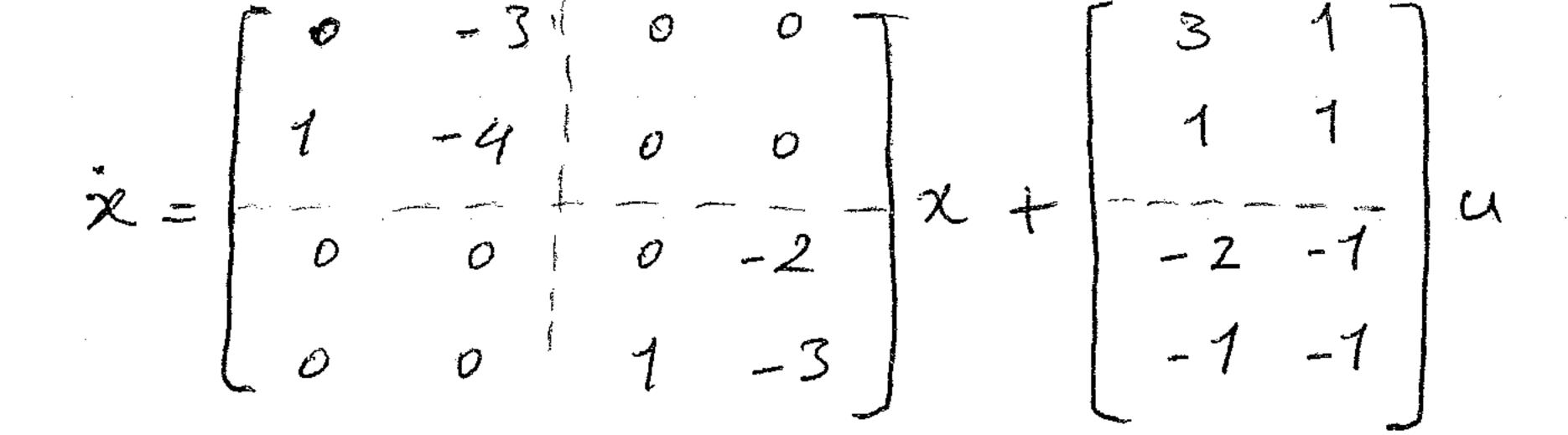
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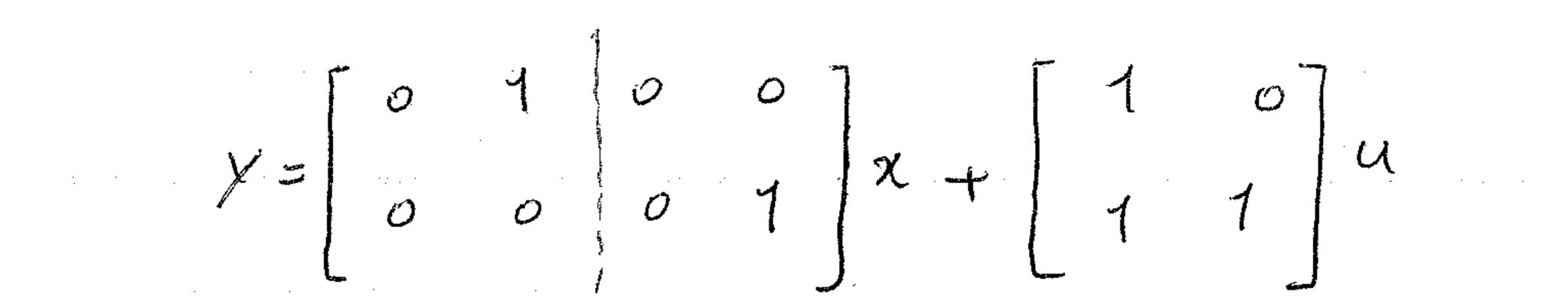


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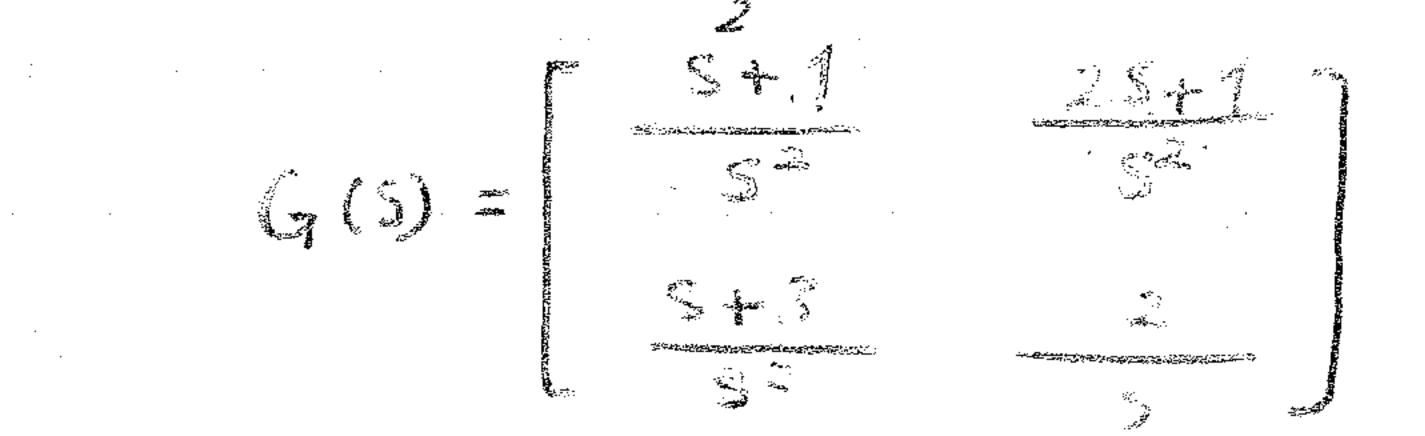
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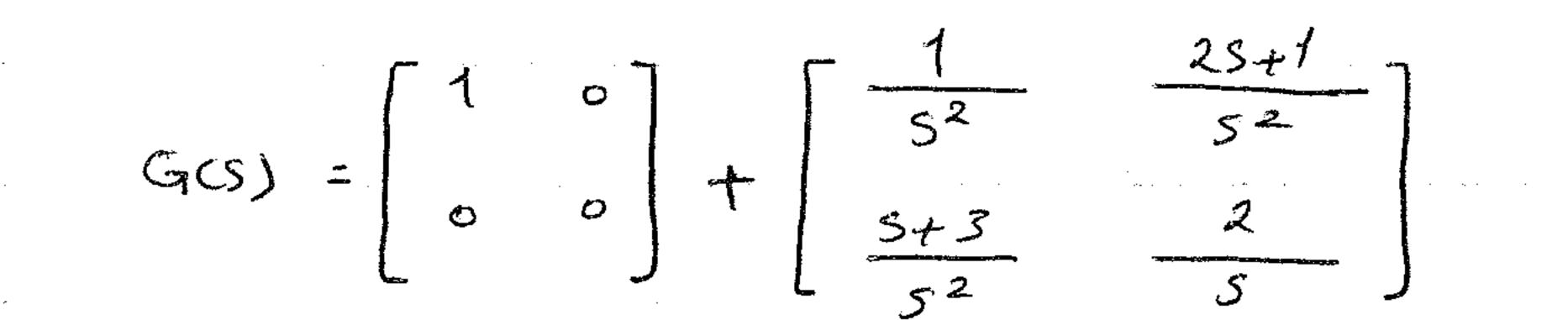
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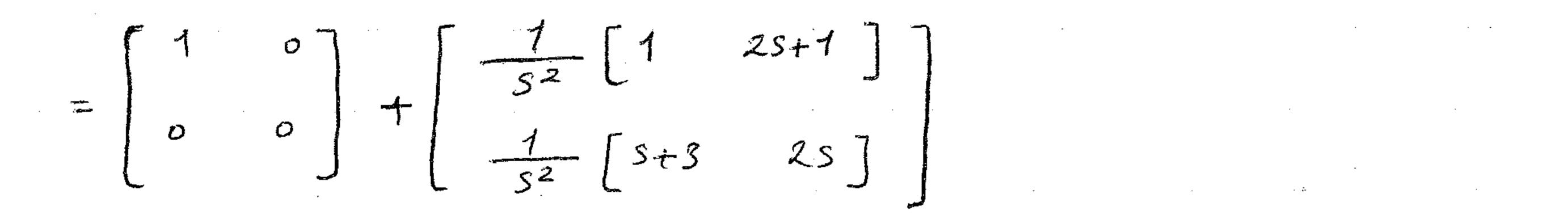




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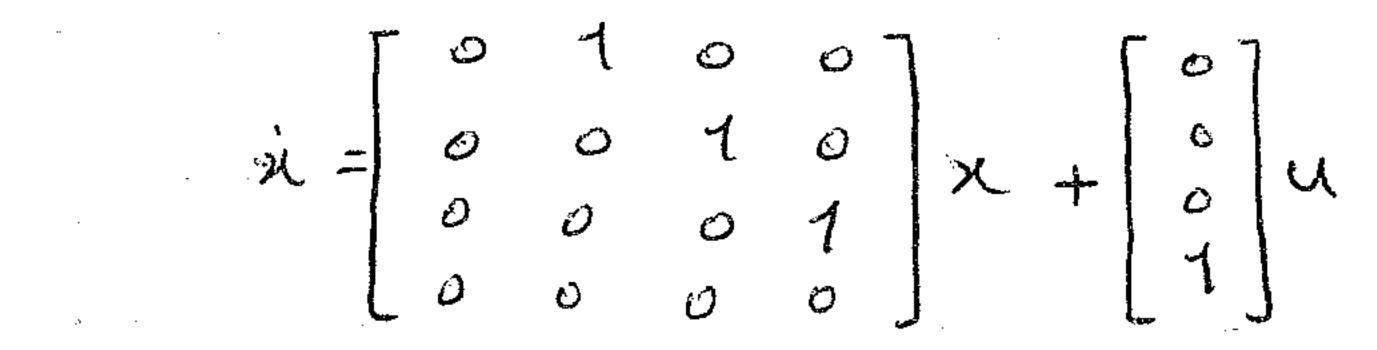
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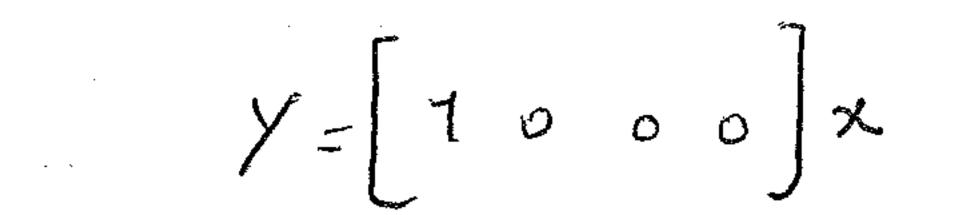
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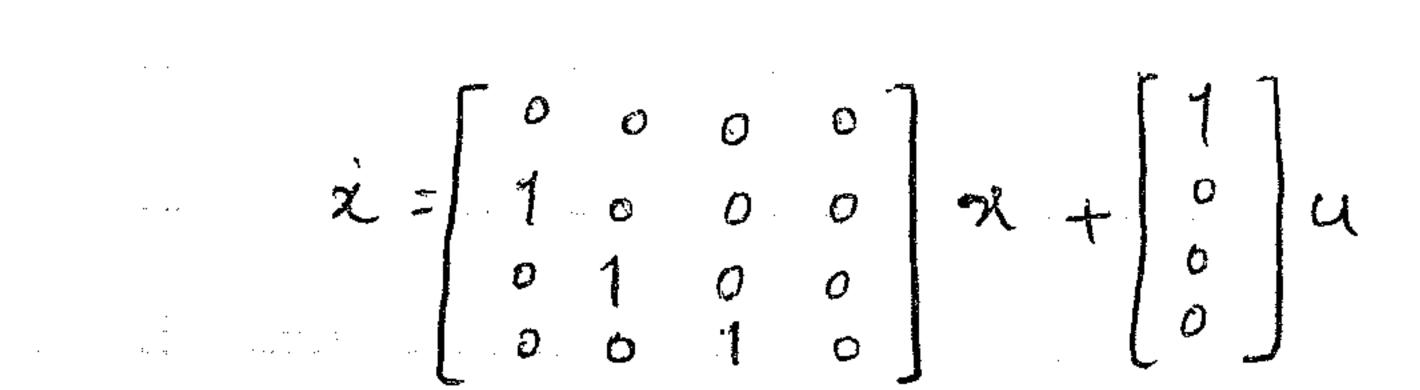
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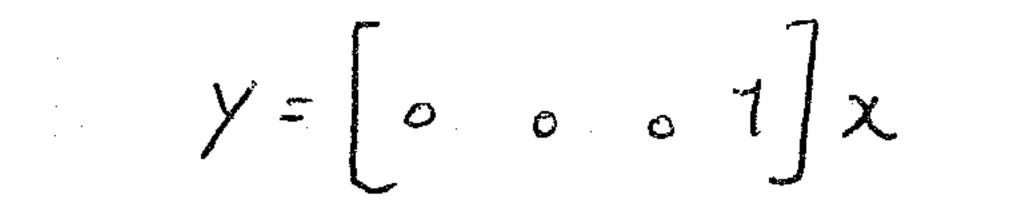
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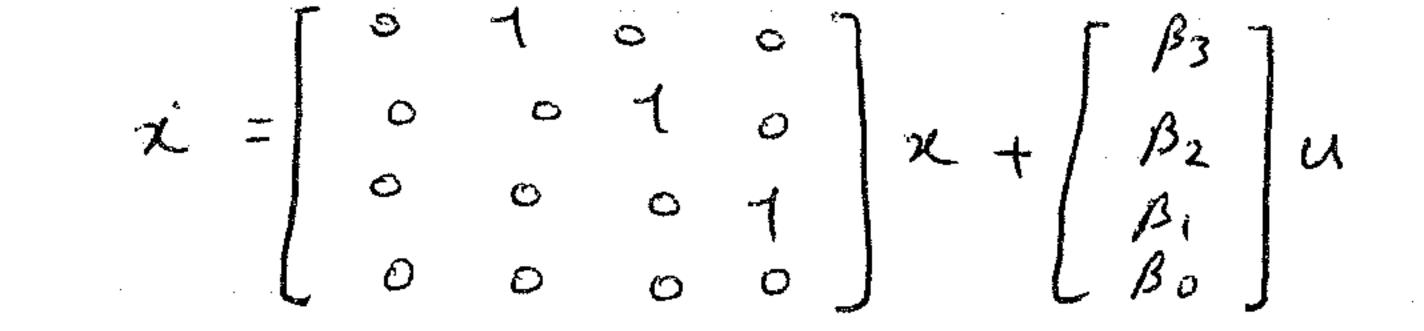
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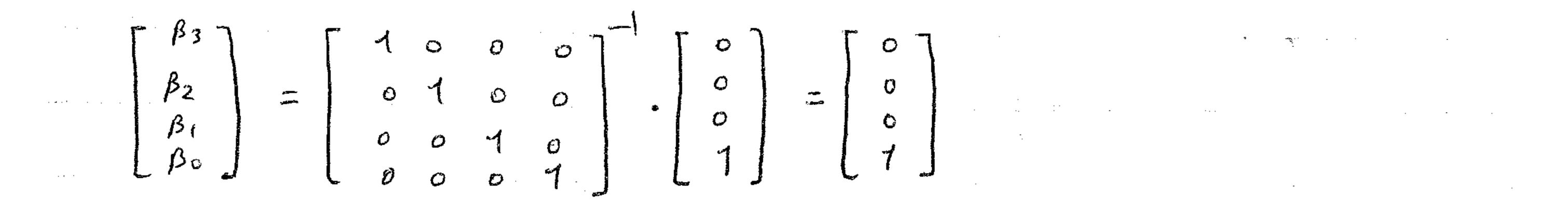


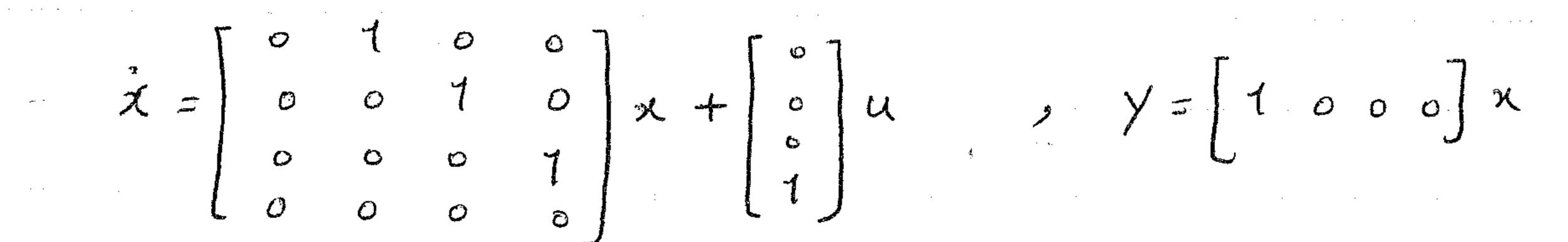
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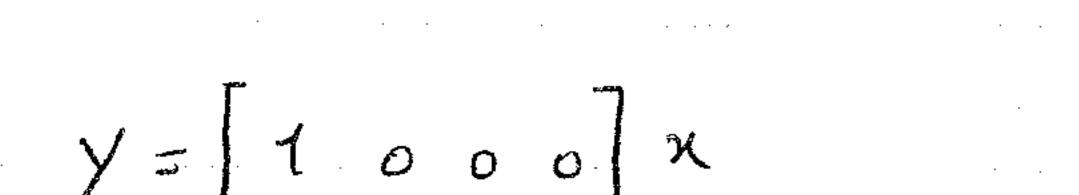


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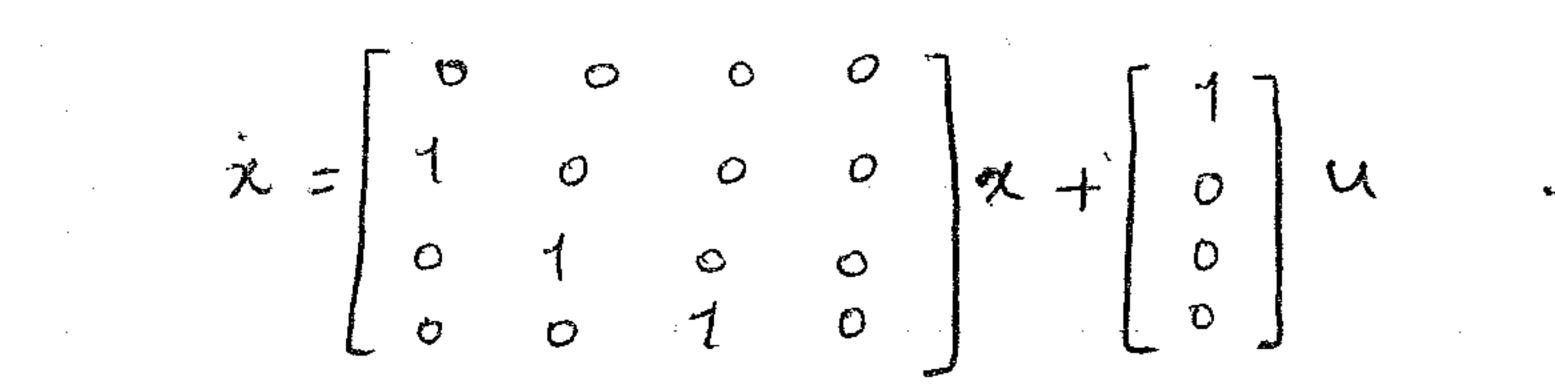
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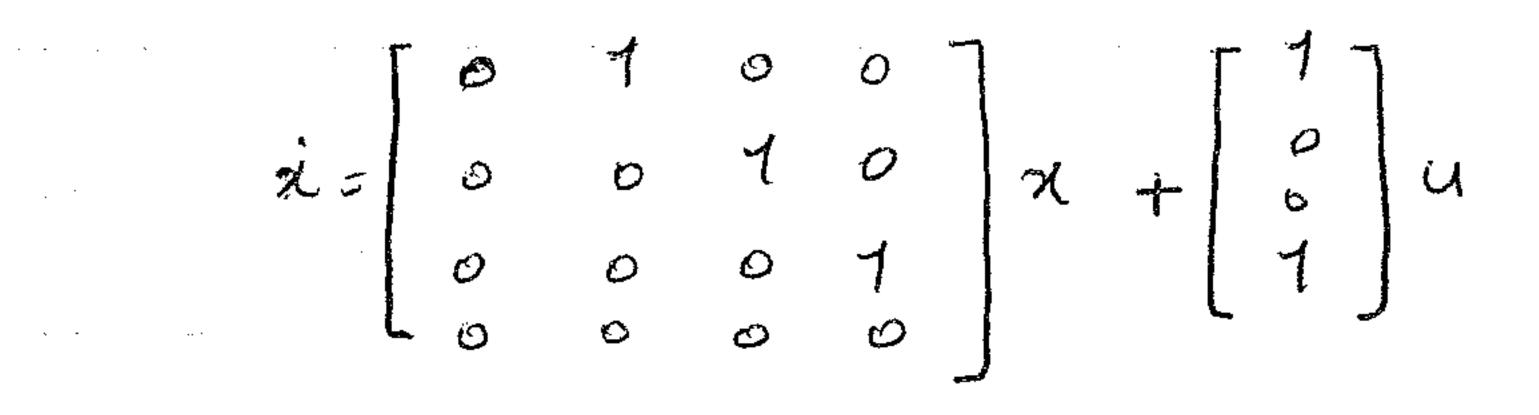
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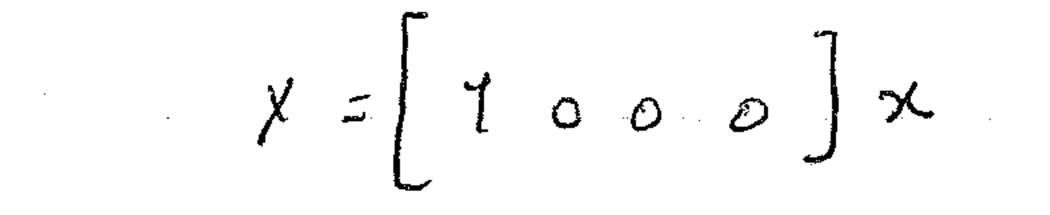
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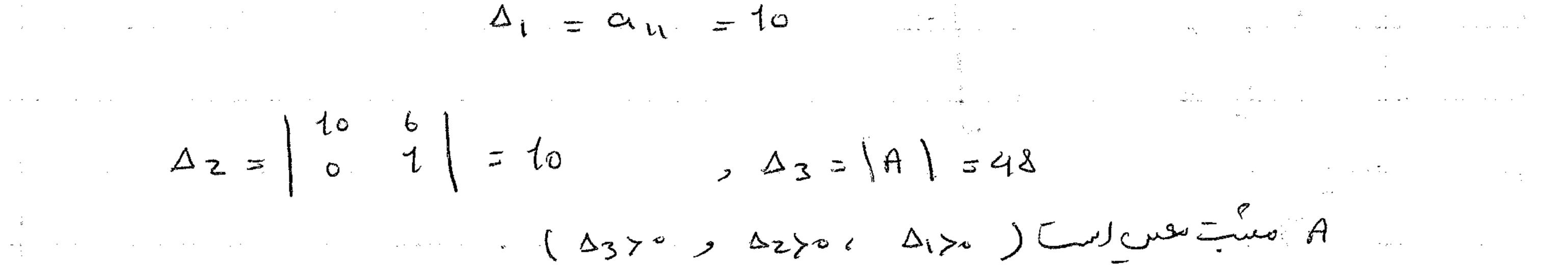
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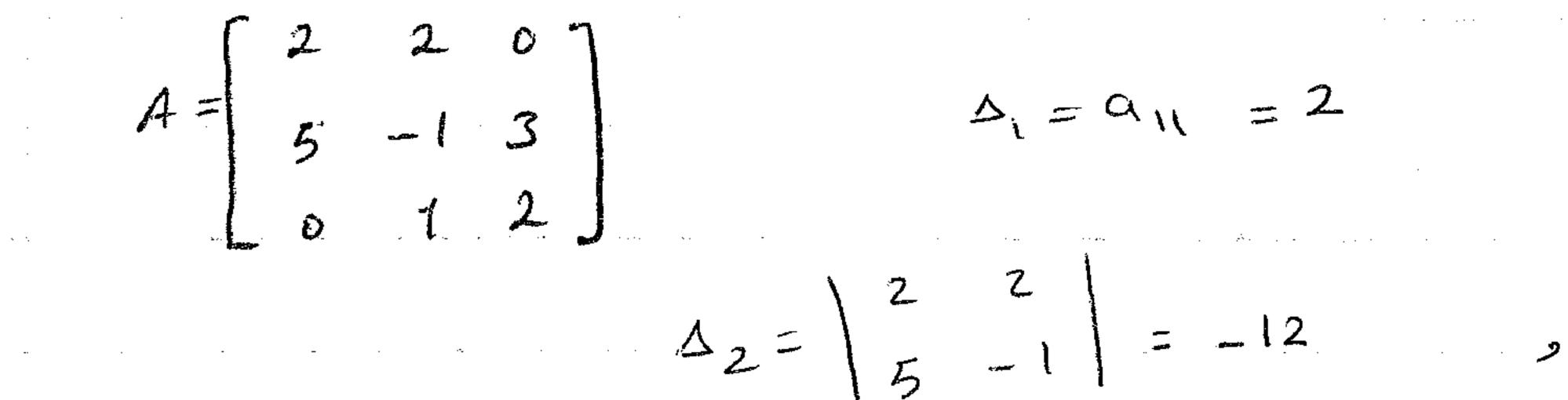
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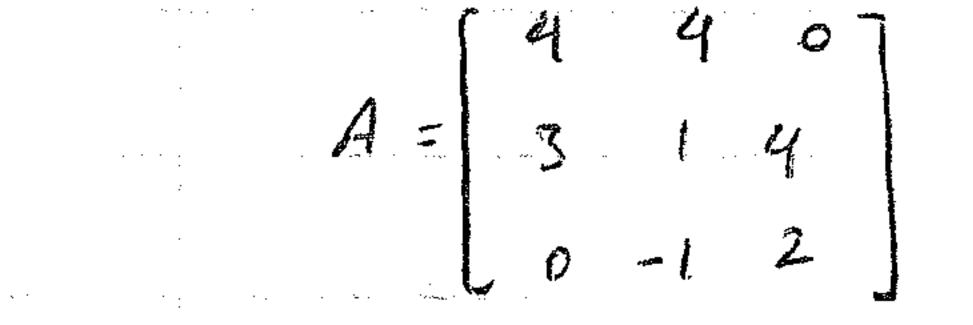
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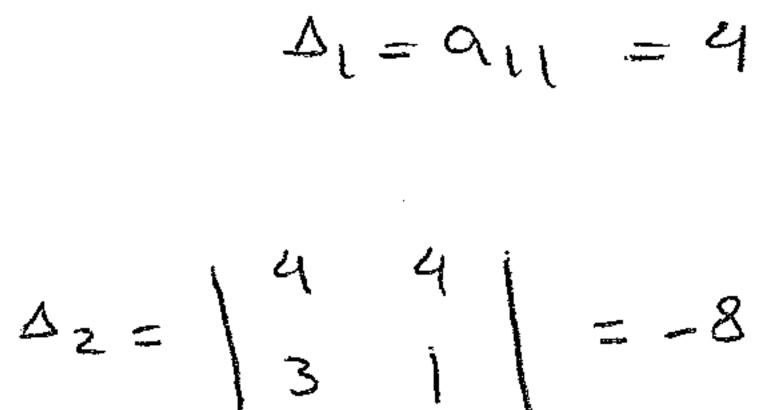
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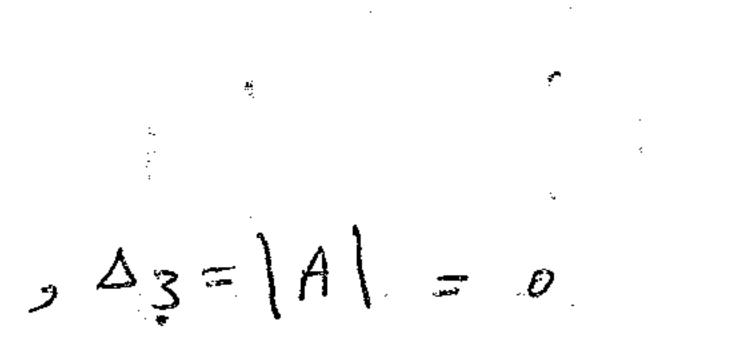




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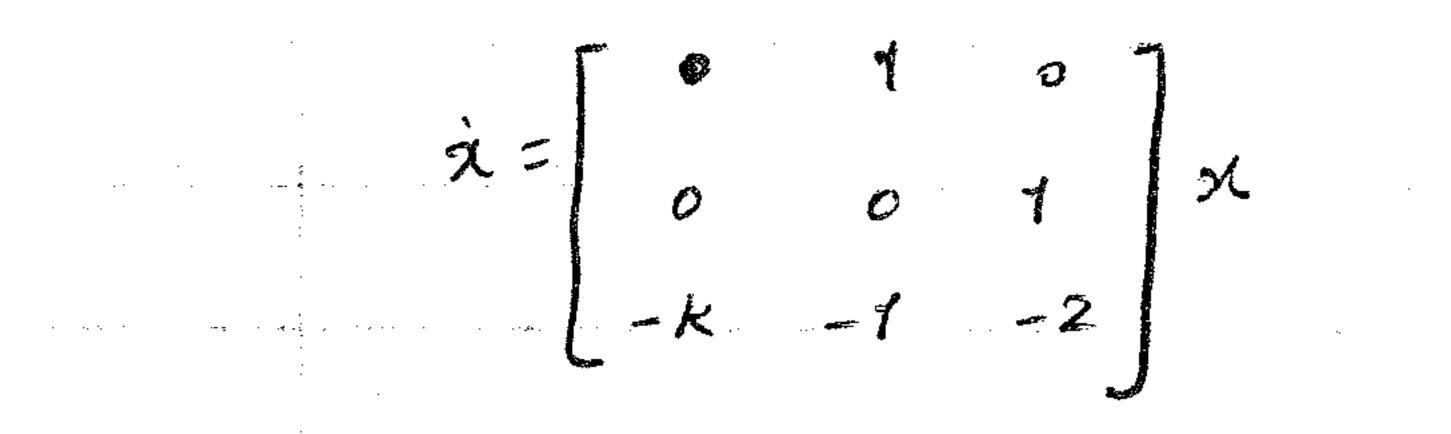
15-10015: (2-5)

 $V(n) = 6 k_{1} + 2 k_{1} \chi_{2} + 4 l_{2}^{2} + l_{2} \chi_{2} \chi_{3} + \chi_{3}^{2}$

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 $\dot{\chi}_2 = \chi_3$

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 $\dot{x}_1 = \chi_2$

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V(n)=12KX1·22+2KX2 + 2KX1·X3 + 82×2·X3 +12×3

 $+12\chi_2(-K_{\eta_1}-\chi_2-2\chi_3)+2\chi_3(-K_{\eta_1}-\chi_2-2\chi_3)$

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 $\dot{v}(n) = (2K - 12)\chi_2 + 56\chi_2 \cdot \chi_3 + 8\chi_3$

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6. 6. 6. (1) 46 in (n) < 0 $\Rightarrow 2k - 12 < 0 \Rightarrow k < 6$

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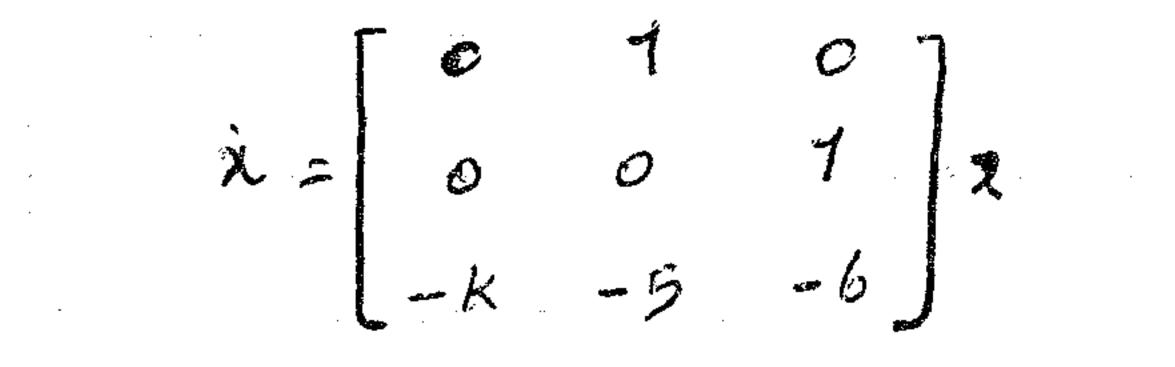
 $\implies (2K - 12)\chi_2 + 56\chi_2 \cdot \chi_3 + \chi_3 = 0$ $\hat{v}(n) = 0$

×, = x, = x 2=0 X 2=0 X, = 0 x, = 0 X, = 0 alie M(n)

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 $\dot{\chi}_1 = \chi_2$

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 $\hat{\chi}_2 = \chi_3$

 $\hat{x}_3 = -k_{\chi_1} - 5\chi_2 - 6\chi_3$

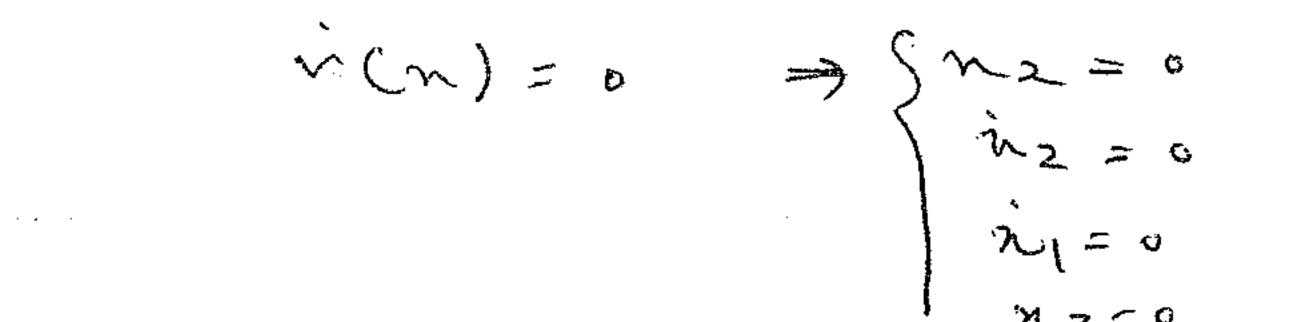
 $\dot{v}(m) = 12 k m \cdot \chi_2 + 2 k \chi_2 + 2 k \chi_1 \cdot \chi_3 + 82 \chi_2 - \chi_3 + 12 \chi_3$ $+ 12 \chi_2 (-K \chi_1 - 5 \chi_2 - 6 \chi_3) + 2 \chi_3 (-K \chi_1 - 5 \chi_2 - 6 \chi_3)$

 \cdot .

 $\dot{v}(n) = (2K - 60) \chi_2$. . .

 $\dot{\psi}(y_{(1)},y_{(2)}) : \dot{\psi}(y_{(1)},y_{(2)}) : \dot{\psi}$ $2.K.60.< \Rightarrow [K.<30]$

=> (K < 30)



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 x_1 $x_2 = \frac{1}{\sqrt{2}} \frac{1}{\sqrt{2$ · ~ ~ ~ ~ ~

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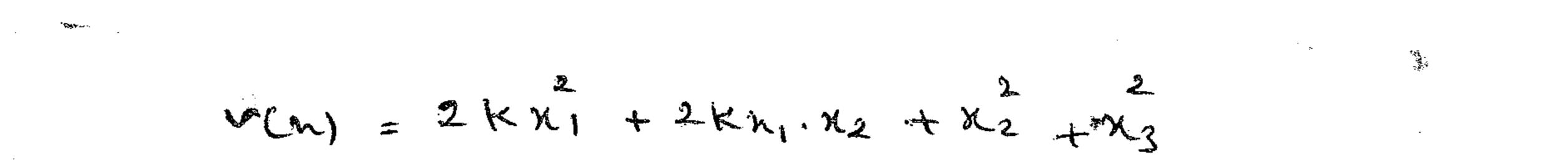
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ر-2) - - - تاج المالية في زير الرطيس ر

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$$\dot{x}(t) = \begin{bmatrix} 0 & 1 & 0 \\ -k & -1 & 0 \end{bmatrix} x$$

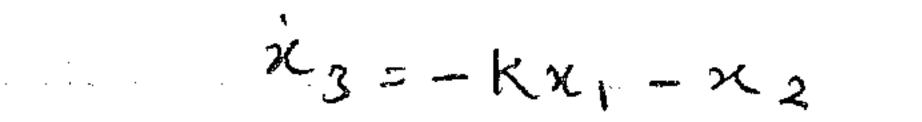








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$$\dot{v}(n) = 4kn_1 \dot{x}_1 + 2k\dot{x}_1 \cdot x_2 + 2k\dot{x}_2 \cdot x_1 + 2x_2 \cdot \dot{x}_2 + 2x_3 \cdot \dot{x}_3$$

.

$$\dot{v}(n) = 4 k x_1 \cdot x_2 + 2 k x_2$$

$$G'GGI_{I}G: \dot{v}(n) < \Rightarrow 4Kn_1, x_2 + 2Kn_2 < \Rightarrow K<0$$

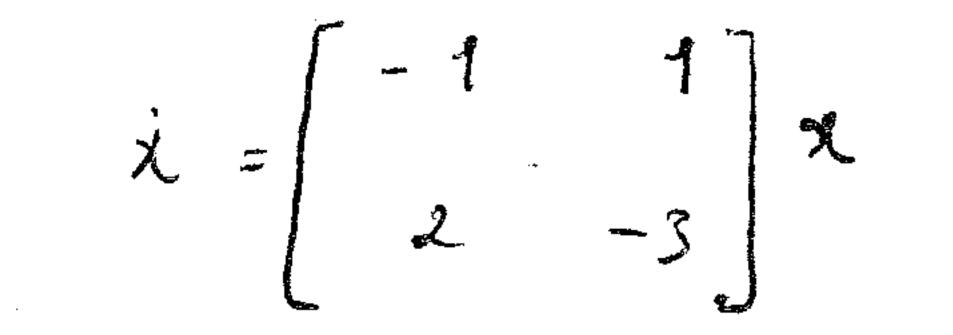
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(5-6): يَتَ تَع لايان في باي سيزير سيكرده وعدارة زاعس كاس



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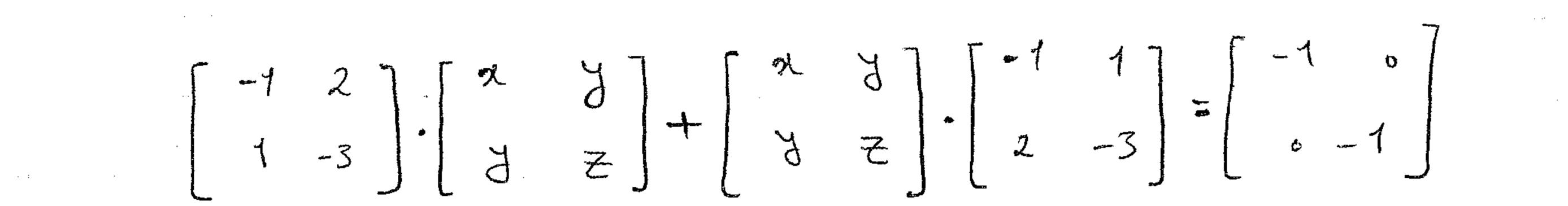
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 $A^{+}.P + P.A = -I$



 $\begin{array}{r} -2x + 4y = -1 \\ x - 4y + 2z = 0 \\ 2y - 6z = -1 \end{array}$

-

 $\frac{3}{16} = \frac{5}{16}, \quad \chi = \frac{9}{8}, \quad Z = \frac{13}{48}$

 $P = \begin{bmatrix} \frac{9}{8} & \frac{5}{16} \\ \frac{5}{16} & \frac{13}{48} \end{bmatrix}$

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Crain vie de de (6-4) مَرَ حديث درجال توقت در ممان دامن وان توان تومط معا دلات زير موصب يرد

 $\dot{x} = \begin{bmatrix} -0.02 & -1.4 & 9.8 \\ -0.01 & -0.4 & 0 \end{bmatrix} \times + \begin{bmatrix} 9.8 \\ 6.3 \end{bmatrix} u$

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لاف) عقب هاى حلقة مازرانعين كنير.

det (SI - A) = 0

 $det \begin{bmatrix} 5+0.02 & 1.4 & -9.8 \\ 0.01 & 5+0.4 & 0 \end{bmatrix} = 0$

 $S^{3} + 0.42S^{2} + 0.02S + 0.09 = 0$. · · ·

 $S_1 = -0.65$, $S_2 = 0.11 + 0.36j$, $S_3 = 0.11 - 0.36j$

ب) قانون مربع حالت وارا معالم من مقار معادر 2-= 2 و $y_{s} = t_{s} = t_{s}$

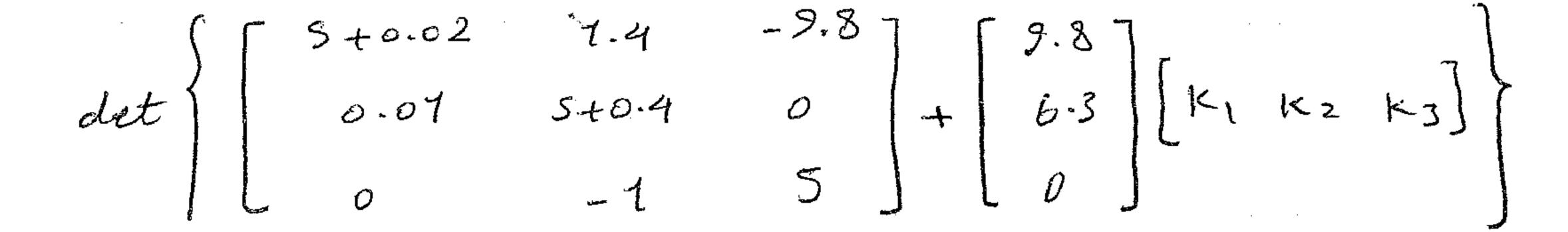
 $- \frac{1}{2} = \frac{1}{3} = \frac{$

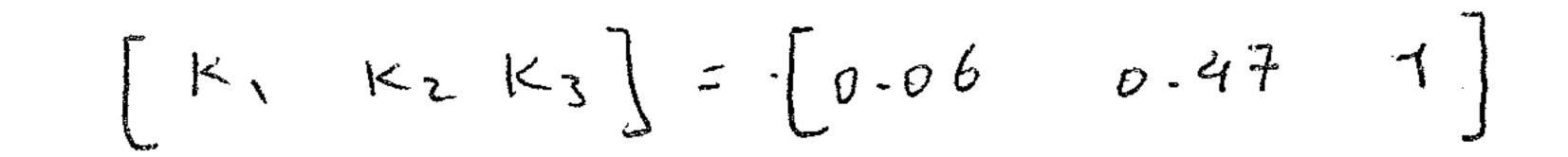
 $\Delta c_{SJ} = S^{3} + 4S^{2} + 6S + 4$

det(SI-A+BK) = 0

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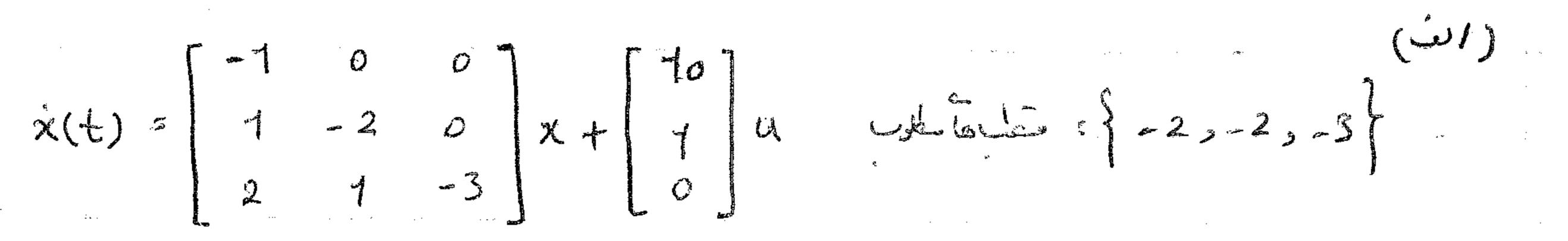


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(6-8): المسيمان زير رادر تقل رضة ، ما مارتري مذيب حالت ورويش هان اراد منه براي تعسي اين مشيك

معلى علم مترارمك عان معلى جان تاريخ



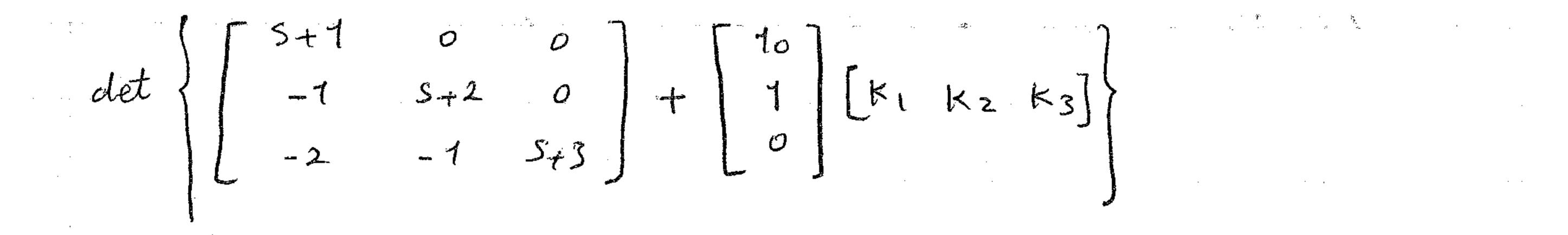
 $det (SI-A) = det \begin{bmatrix} S+1 & 0 & 0 \\ -1 & S+2 & 0 \\ -2 & -1 & S+3 \end{bmatrix} = 5^{3}+65^{2}+11S+6$

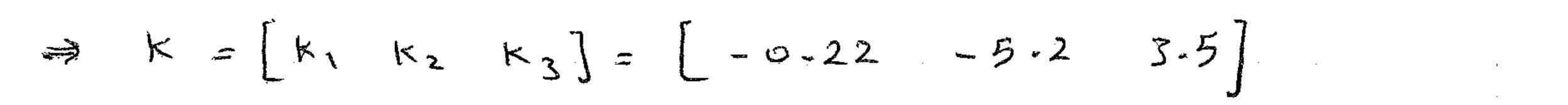
 $dw = \Delta(S) + S^3 + 6S^2 + 11S + 6$

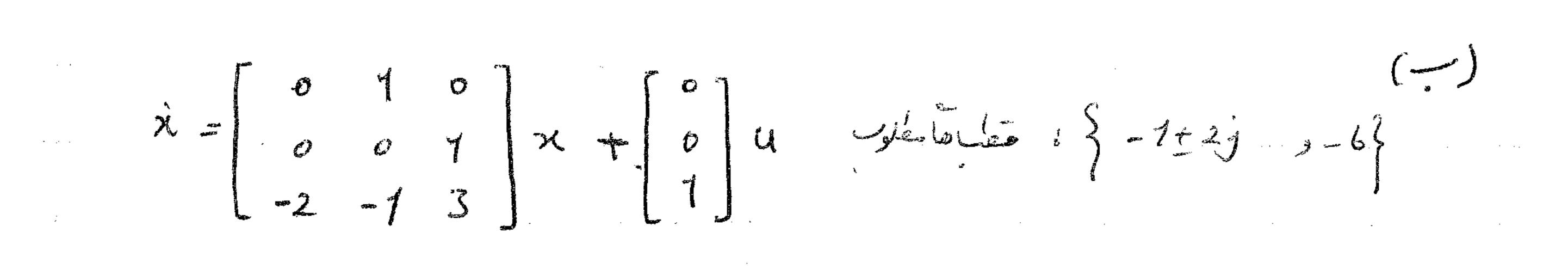
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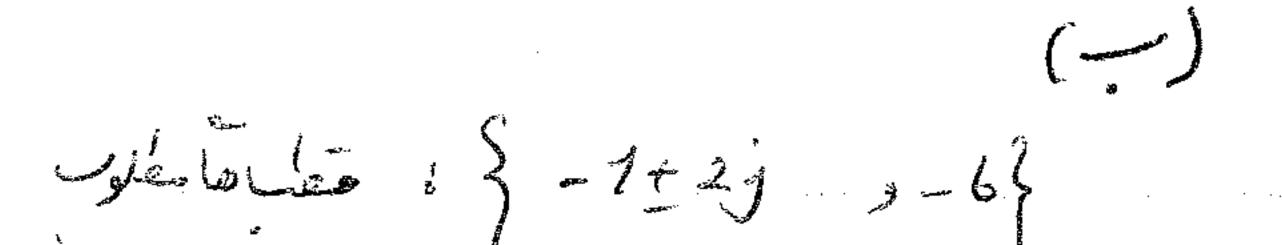
 $(-) \Delta(S) = (S+2)^2(S+3) \implies (\Delta(S) = S^3 + 7S^2 + 16S + 12)$

det (SI-A+BK)











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 $M_{1}^{2} \Delta (S) = S^{3} - 3S^{2} + S + 2$

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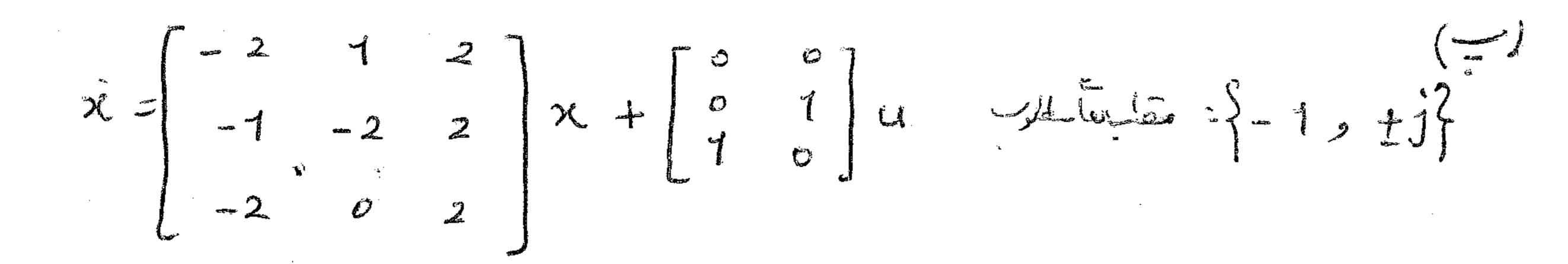
 $-d_{1} = 5^{3} + 8S^{2} + 175 + 30$

 $y=\Delta(s) = (s + 1 + 2j)(s + 1 - 2j)(s + 6)$

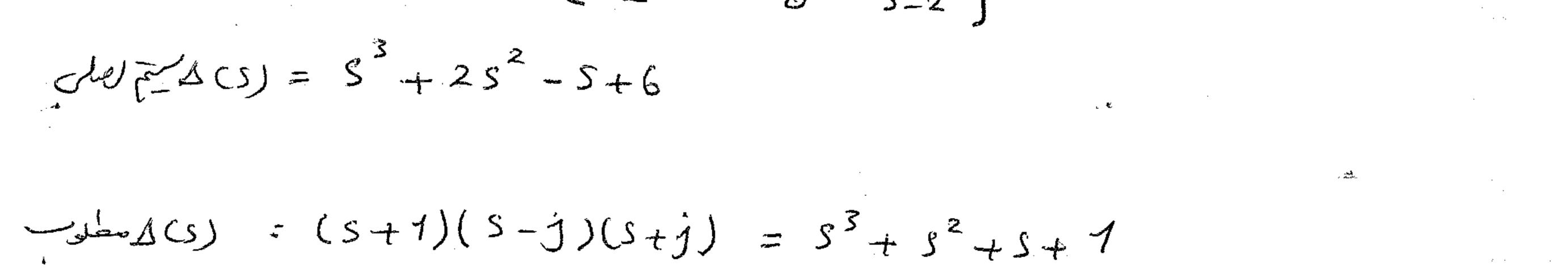
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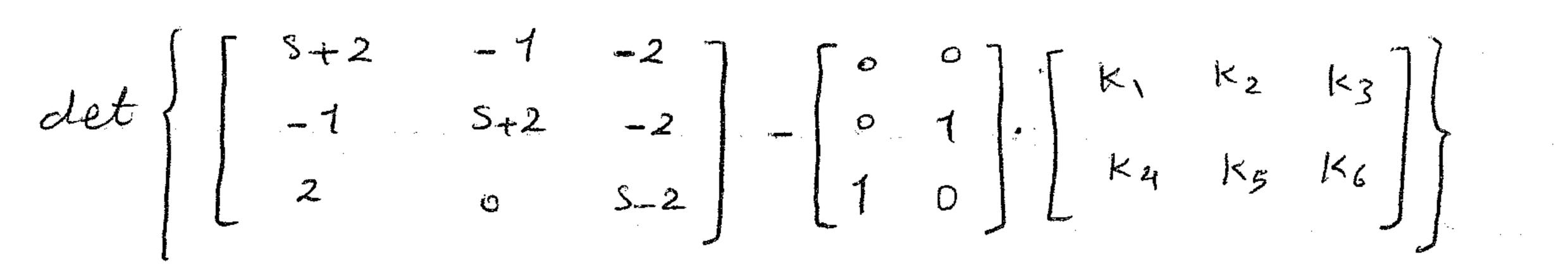
 $K = \begin{bmatrix} 28 & 76 & 77 \end{bmatrix}$

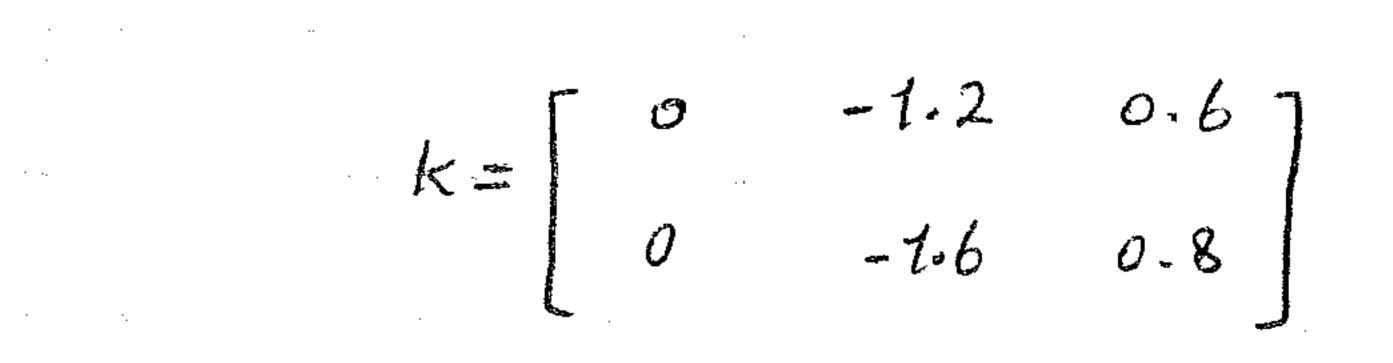


 $det(SF-A) = 0 \implies \begin{bmatrix} S+2 & -1 & -2 \\ -1 & S+2 & -2 \\ 2 & 0 & S-2 \end{bmatrix} = A(S)$



det (SJ - A+BK)





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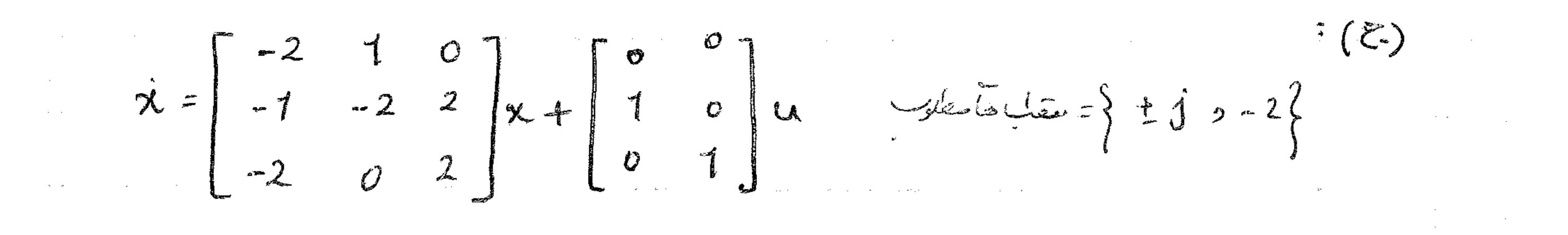
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 $det = S(S) = det (SF - A) = 0 \Rightarrow \begin{bmatrix} S+2 & -1 & 0 \\ 1 & S+2 & -2 \end{bmatrix}$

$$\Delta(s) = s^{3} + 2s^{2} - 3s - 6$$

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$$\int J = (S+j)(S-j)(S+2) = S^3 + 2S^2 + S+2$$

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$$det \begin{cases} 5+2 & -1 & 0 \\ 1 & 5+2 & -2 \\ 2 & 0 & 5-2 \end{cases} + \begin{pmatrix} 0 & 0 \\ 1 & 0 \\ k_4 & k_5 & k_6 \end{cases}$$

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 $K = \begin{bmatrix} 4 & -4 & 2 \end{bmatrix}$ $K = \begin{bmatrix} -2 & 0 & 4 \end{bmatrix}$

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e de la construcción de la const · · ·

 $\dot{x} = \begin{bmatrix} -4 & -4 & -2 \\ 4 & 0 & 7 \\ 6 & 9 & 2 \end{bmatrix} x + \begin{bmatrix} -1 \\ 2 \end{bmatrix} u$ $\vec{x} = \begin{bmatrix} -4 & -4 & -2 \\ -1 & 0 & 7 \\ -1 & 0 & 1 \\ -1 & 0 \end{bmatrix} x + \begin{bmatrix} -1 \\ 2 \end{bmatrix} u$

الفن) معادلت وفر من الن مي الن مي الن ما ومنال مرك كمده مرك كسر

(10 ACS) = (SJ-A) = 0

 $det \begin{bmatrix} 5+4 & 4 & 2 \\ -1 & 5 & -1 \end{bmatrix} = 0 \implies A(5) = 5^{3} + 25^{2} - 5 - 2$ $det \begin{bmatrix} -6 & -9 & 5-2 \end{bmatrix} = 0 \implies A(5) = 5^{3} + 25^{2} - 5 - 2$ · · · ·

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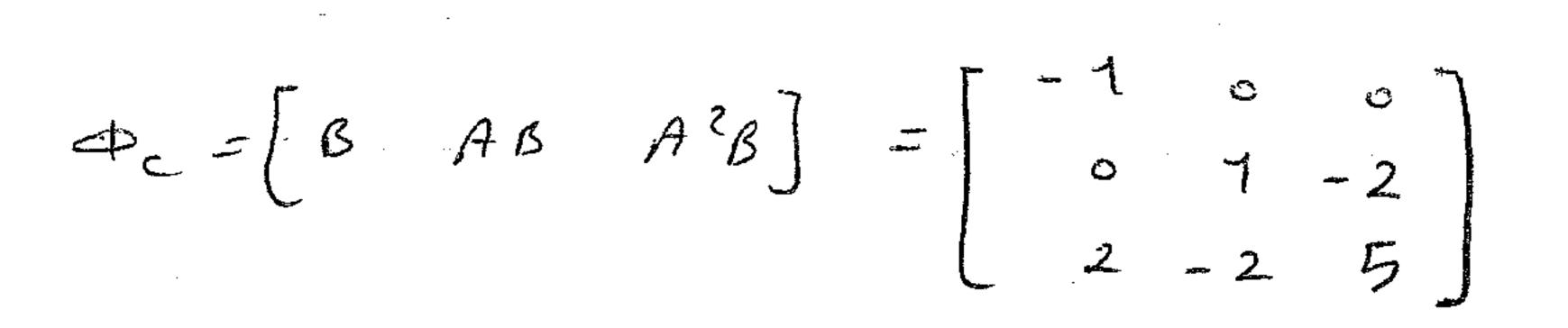
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 $T = \Phi_c \cdot W$

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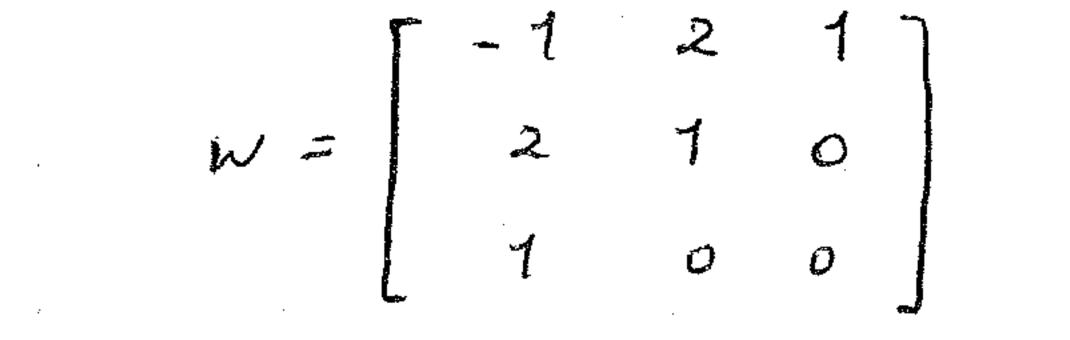
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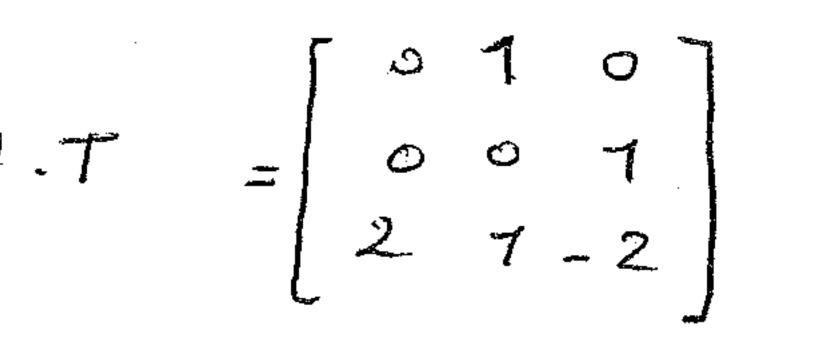
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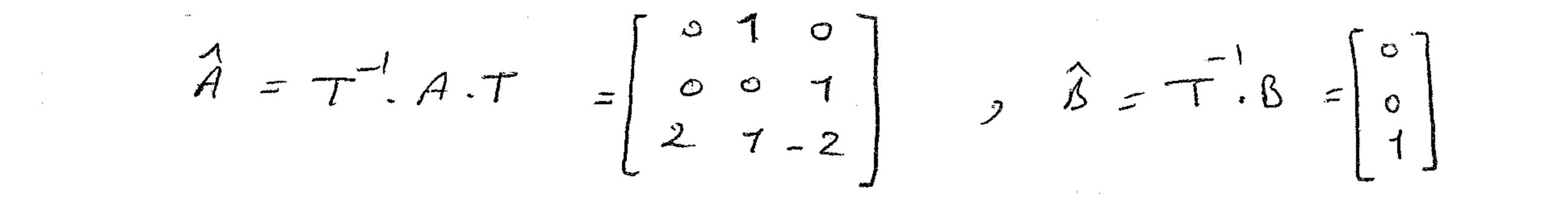
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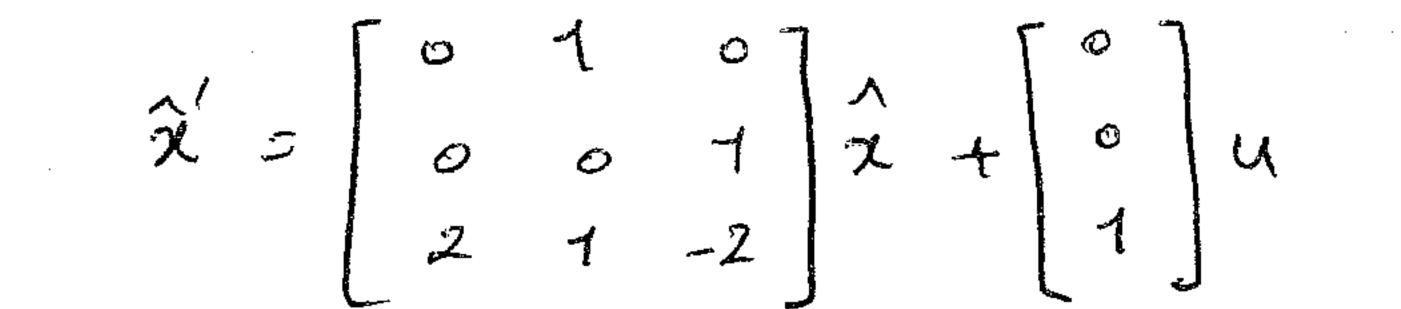
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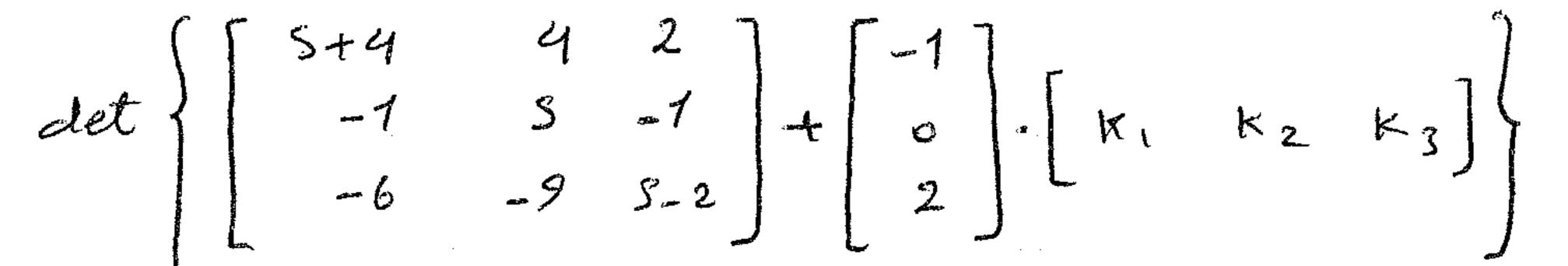
ب) بره سر حالت x راهیان کس کند تا جا ناع در اس سیم از 3- انتال داده وس ر حظا ما العيرمده. $F_{2} = \frac{1}{5} = \frac{1}{5$ 12006

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 $= 5^{3} + 65^{2} + 11 + 6$ $\int ds = (s+1)(s+2)(s+3)$

det (SJ - A + BK) = 0



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 $k = \begin{bmatrix} 20 & 28 & 12 \end{bmatrix}$

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and when the one of the

(1-7) مادلات حالت وطرعا المرزر رادر مطرير :

 $\dot{x} = \begin{bmatrix} 1 & 1 \\ 2 & 0 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u , \quad \dot{y} = \begin{bmatrix} x & 1 \end{bmatrix} x$

الف) براجع ماري لا له من تل روت روان مي عالى ر.

در طام میروست مترط لازم و کان دس است مسیح رومیت میرو تر. می وای حارین در به مسیح اردیت تا بندی کندی توان روستر طراح بود.

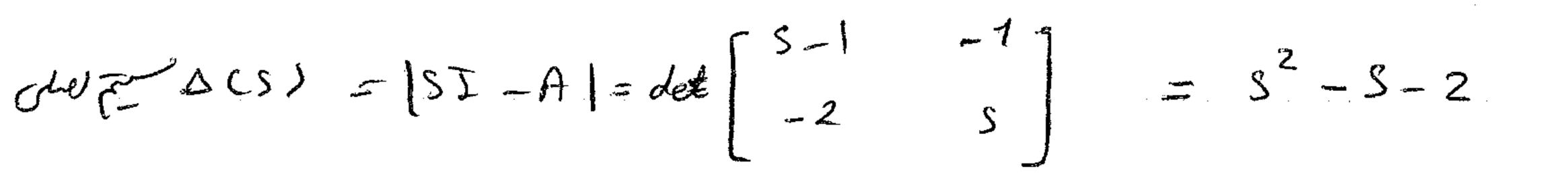
 $\Phi_0 = \begin{bmatrix} c \\ cA \end{bmatrix} = \begin{bmatrix} \alpha & 1 \\ x+2 & \alpha \end{bmatrix}$

 $\Rightarrow x^2 - x - 2 = 0 \Rightarrow [x = -1, 2]$ $det(\phi_0) = 0$

-) دار مدیر روز تو م ویل میزا کند ، عفای تین استار ورزه 1- و 2-

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 $\chi = 0 \quad \Rightarrow \quad \gamma(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \chi$.



 $-dcS) = (S+1)(S+2) = S^2 + 3S+2$

det (SF-A+LC)

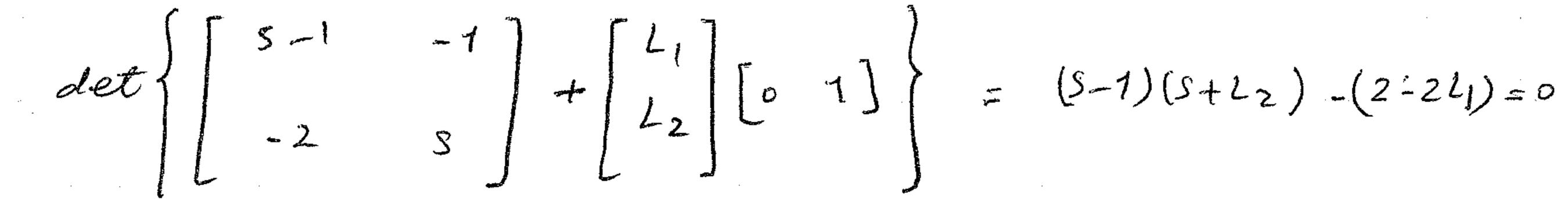
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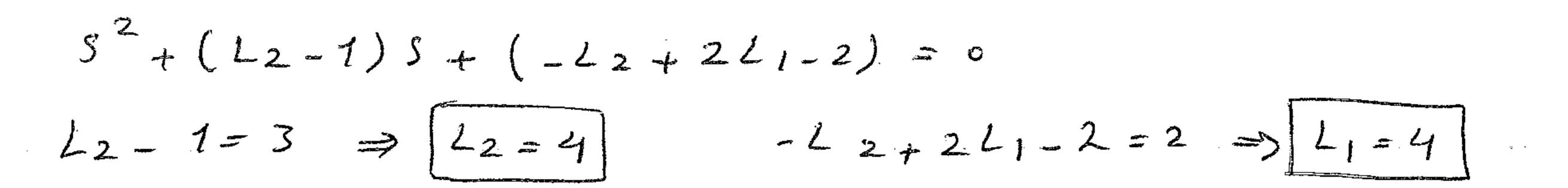
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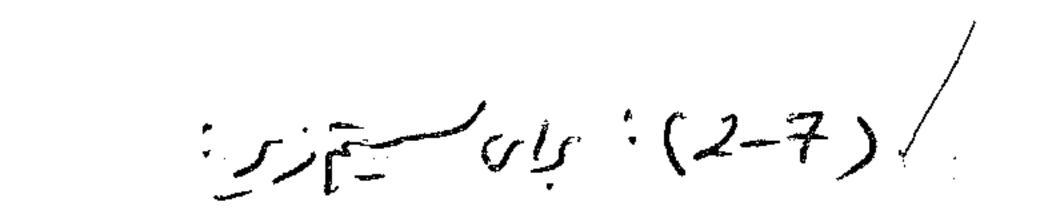
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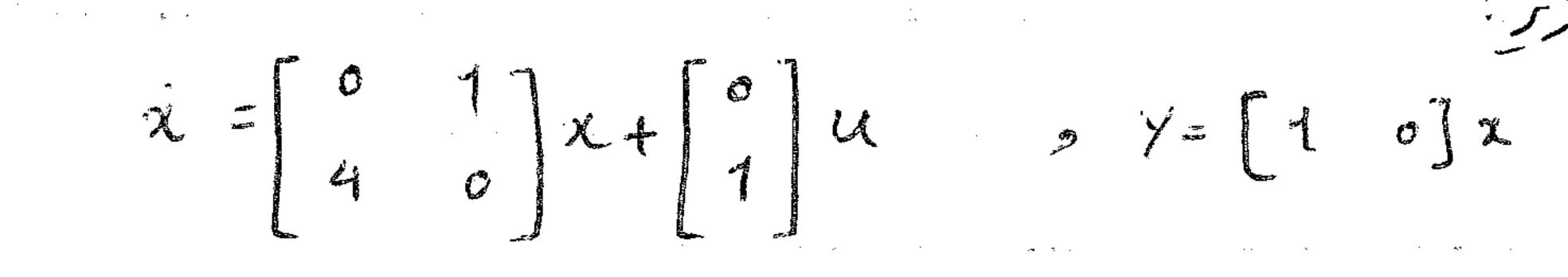
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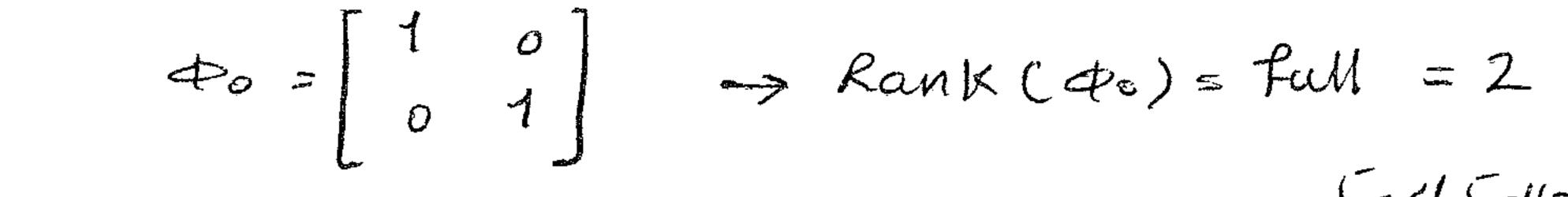






مكرم بالمعادير وتره در 6- د طامى كنير.

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مت مرد شرک مل حالت الست

م مرتون مرتشرط مراحر.

def = |SI - A| = 0 $\Rightarrow \Delta(S) = S^2 - 4$

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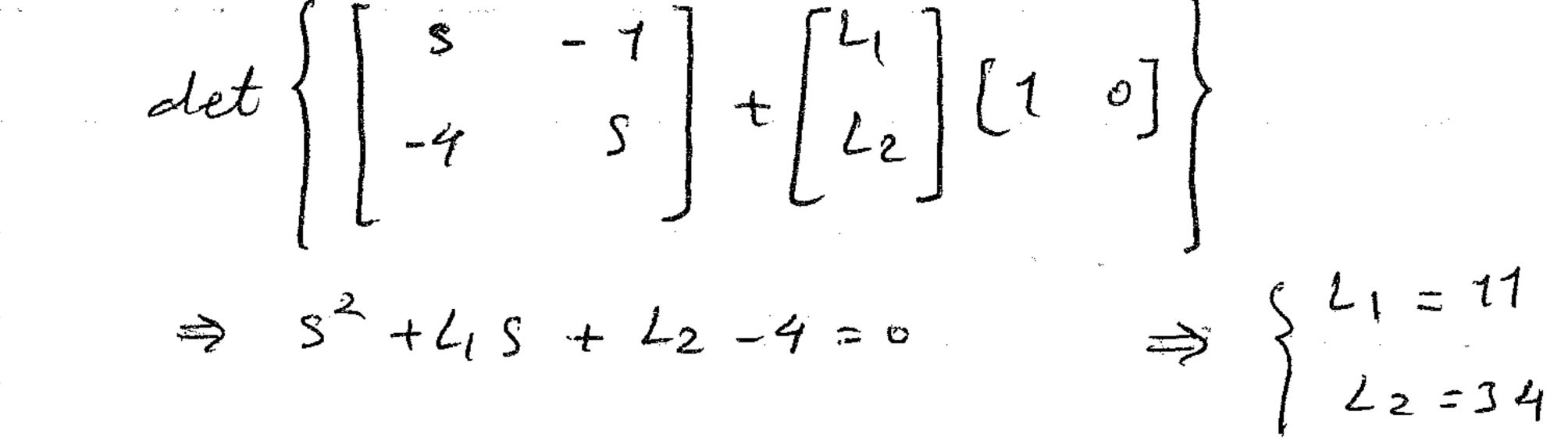
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 $-3c_{S} = (S+6)(S+5) = S^2 + 11S + 30$. _ ...

det(SI - A + LC) = 0n de Marine Marine de Antimiser de la construcción de Marine de

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الرمام معادلم حرفان مال معادلم تر دارا ت

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y(t) =· pos alle of out of a file a ilon the polis

 $\Phi_{0} = \begin{bmatrix} 1 & \alpha \\ 4\alpha & 1 \end{bmatrix}$ $\Rightarrow det(=\phi_0) = 1 - 4 \alpha^2$ براي جاني والمحمد المحمد محمد محمد مرد الم · jedet(40) to 10 in the first in loss in

- · · · · · · · and the second second

1-42 = + 0 $\Rightarrow x \neq \pm \frac{1}{2}$ Sit & NONTEDSONE

(7-2): -- توصف تده بعال زرا در ظرير.

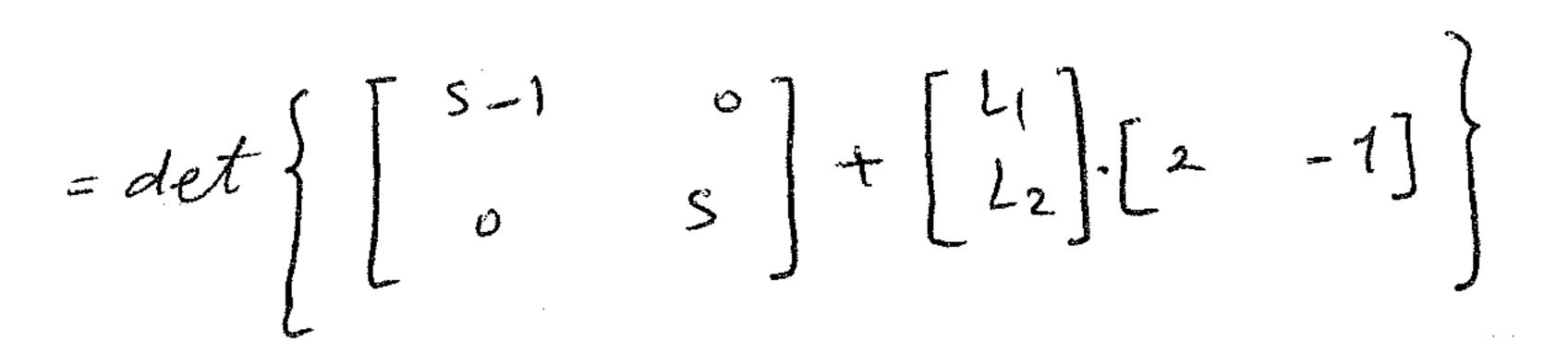


المر رام كنيد الحاى تحتي را حداق الرعات عن مع من عن من كند.

حون محفاهم حدام موت تحنين عن منه از العنام مطوب باي رو تر را 10-= ٢ و · 12-22 - 12.

Jersch = (S+10)(S+12) = S² + 22S+120

det (SJ - A+LC)



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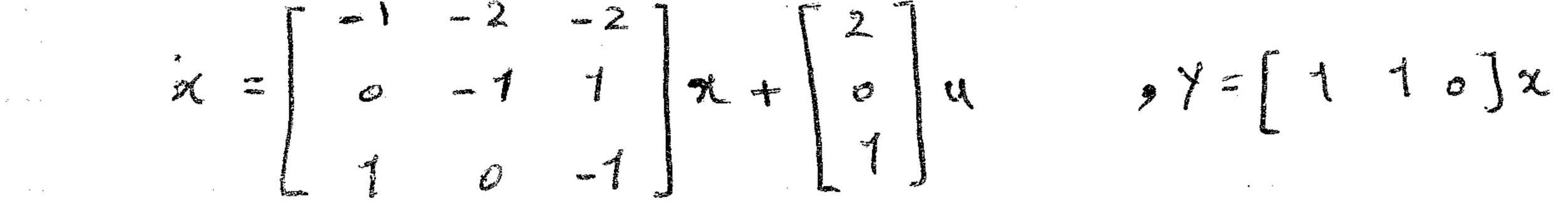
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= S³+ (211-1-12)S + 2112

 $22 = \begin{cases} -15 \\ -8 \end{cases}$ $21 = \begin{cases} -19 \\ -15.5 \end{cases}$

 $\begin{bmatrix} L_1 \\ L_2 \end{bmatrix} = \begin{bmatrix} -19 \\ -15 \end{bmatrix} \quad OR \begin{bmatrix} -15 \cdot 5 \\ -8 \end{bmatrix}$

(7-8): مسركار من عادلات حالت ورفع زيرادر تركير .



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· · $det = \Delta(S) = det (SI - A)$

 $= det \begin{bmatrix} s+1 & 2 & 2 \\ 0 & s+7 & -7 \end{bmatrix} = s^{3} + 3s^{2} + s - 3 = \Delta(s)$ $\begin{bmatrix} -1 & 0 & s+7 \end{bmatrix}$

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 \mathcal{A}_{1} , where \mathcal{A}_{2} is the second second

 $\int d(s) = ((s+2)^2(s+3) = s^3 + 7s^2 + 16s + 12$

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 $\begin{cases} \begin{bmatrix} S+1 & 2 & 2 \\ 0 & S+7 & -7 \\ -1 & 0 & S+7 \end{bmatrix} + \begin{bmatrix} L_1 \\ L_2 \\ L_3 \end{bmatrix} \begin{bmatrix} 1 & 1 & 0 \\ 1 \end{bmatrix} \end{cases}$

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