Exam 3 SI Review

Problem 1

\[
L^{-1}\left\{\frac{2s+5}{(s^2+1)(s+5)}\right\}
\]

Problem 2

\[
L^{-1}\left\{\frac{45}{(s+6)(s^2+9)}\right\}
\]

Problem 3

Find the critical points of:

\[
x' = -2x - 5y, \quad y' = x + 2y
\]

Problem 4

Find the critical points of:

\[
x' = 10x - 5xy, \quad y' = 3y + xy - 3y^2
\]

Problem 5

Find with variations of parameters

\[
X' = \begin{pmatrix} 2 & -1 \\ 3 & -2 \end{pmatrix} X + \begin{pmatrix} e^t \\ -e^t \end{pmatrix}
\]

Problem 6

Find the IVP

\[
X' = \begin{pmatrix} -5/4 & 1/2 \\ -1 & -2 \end{pmatrix} X, \quad X(0) = \begin{pmatrix} 1 \\ 2 \end{pmatrix}
\]

Problem 7

Use Laplace to solve:

\[y'' - 6y' + 5y = 0, \quad y(0) = 1, \quad y'(0) = 0\]