Dear Students:
Since nobody has solved this problem, I have worked out a solution pretending that I do not know the theory. Please confirm that my solution is correct.

**Solution to Problem 3 in the Quiz on October 25:** We have

\[
Y_1' = Y_1 + Y_2 + Y_3
\]
\[
Y_2' = Y_1 + Y_3
\]
\[
Y_3' = -Y_1 - Y_2 - Y_3.
\]

Since \( Y_1' = -Y_3' \), we have \( Y_1 = -Y_3 + C \) with a constant \( C \). Then the equation for \( Y_2' \) reads as \( Y_2' = C \), so

\[
Y_2(t) := C t + C_2
\]

with a constant \( C_2 \). The equation for \( Y_1' \) reads as \( Y_1' = Y_2 + C \), so

\[
Y_1(t) := C_1 t^2 + C_2 t + C_3
\]

with a constant \( C_3 \). Finally

\[
Y_3(t) = -Y_1(t) + C_1 = -C_1 t^2 - C_2 t - C_3 + C_1.
\]

Now \( Y_1(0) = 1, Y_2(0) = 1, \) and \( Y_3(0) = -1 \) give \( C_2 = 1, C_3 = 1, \) and \( C_1 = 0 \). So

\[
Y_1(t) = t + 1
\]
\[
Y_2(t) = 1
\]
\[
Y_3(t) = -t - 1.
\]