EE2190 Quiz 1, Spring 2005

Show your work for full credit.

1. Given \( A = (\sqrt{3} - j3)^{1/3} \), express \( A \) in Cartesian form \((x + jy)\) (4 points)

\[
A = \left[ \sqrt{3} + 9 \exp^{j \tan^{-1} \frac{\sqrt{3}}{3}} \right]^{1/3} \\
= 12^{1/6} \exp^{-j \frac{60\degree}{3}} \\
= 1.5131 \exp^{-j20\degree} \text{ (only 1 root of 3)} \\
= 1.4218 - j0.5175
\]

2. Given the differential equation:

\[
\frac{d^2y}{dt^2} - \alpha^2 y = 0,
\]

find the solution for \( y(t) \) in terms of two constants, \( A \) and \( B \). (4 points)

\[
y(t) = A e^{\alpha t} + B e^{-\alpha t}
\]