

Math 309 Quiz 3

April 22, 2016

Problem 1. Suppose that A is a 3×3 matrix with a single eigenvalue λ of algebraic multiplicity 3 and geometric multiplicity 2. What is the Jordan normal form of A ?

Problem 2. Calculate a fundamental matrix for the system of equations

$$\frac{d}{dx}\vec{y} = A\vec{y}, \quad A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

Problem 3. Find a particular solution of the differential equation

$$\frac{d}{dx}\vec{y} = A\vec{y} + \vec{b}(x), \quad A = \begin{bmatrix} -1 & 1 \\ -1 & -1 \end{bmatrix}, \quad \vec{b}(x) = \begin{pmatrix} e^{2x} \\ 0 \end{pmatrix}$$

[Hint: propose $\vec{y}_p = e^{2x}\vec{c}$]