Q1.

In each of Problems 1 through 11:

a. Seek power series solutions of the given differential equation about the given point x_0; find the recurrence relation that the coefficients must satisfy.

[redacted]

c. By evaluating the Wronskian $W[y_1, y_2](x_0)$, show that y_1 and y_2 form a fundamental set of solutions.

d. If possible, find the general term in each solution.

[redacted]

2. $y'' + 3y' = 0, \quad x_0 = 0$

原题

Q2: 原题

EXAMPLE 2

Describe the qualitative nature of the solution of the initial value problem

$$y'' + 4y = g(t), \tag{17}$$

$$y(0) = 0, \quad y'(0) = 0, \tag{18}$$

where

$$g(t) = \begin{cases} 0, & 0 \le t < 5, \\ \frac{1}{5}(t-5), & 5 \le t < 10, \\ 1, & t \ge 10, \end{cases} \tag{19}$$

and then find the solution.

Q3: a) **6.** $\mathbf{x}' = \begin{pmatrix} 2 & -1 \\ 3 & -2 \end{pmatrix}\mathbf{x} + \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^t$ ← 类似但 matrix A 中数有改

2阶对算

b) **7.** $\mathbf{x}' = \begin{pmatrix} 1 & -5 \\ 1 & -3 \end{pmatrix}\mathbf{x}, \quad \mathbf{x}(0) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

Q4

5. $dx/dt = x - x^2 - xy, \quad dy/dt = 3y - xy - 2y^2$

原题

a. Determine all critical points of the given system of equations.

b. Find the corresponding linear system near each critical point.

c. 写有1 critical point 的特点类型

Q5: Ch11.3 例题，边界条件一样，y，x 前系数改动

Solve the boundary value problem

$$y'' + 2y = -x, \quad y(0) = 0, \quad y(1) + y'(1) = 0.$$