

Quiz 1

name:

1. What is a dynamical system?

- When is a dynamical system linear?
- When is a dynamical system time-invariant?

2. What representations do you know of a linear time-invariant system? Write the corresponding formulas.

-
-
-
-

3. Consider the system defined by the constant coefficients ordinary differential equation $\frac{d}{dt}y + y = 0$.

- Is this system linear and is it time-invariant?
- Describe its trajectories (*i.e.*, solve the equation $\frac{d}{dt}y + y = 0$).

4. Is the system defined by $\frac{d^2}{dt^2}y + 3\frac{d}{dt}y + 2y = 0$ linear and is it time-invariant? Describe its trajectories.

5. Consider the discrete-time system defined by the convolution sum $y = h \star u$, where $h = (1, 1, 0, \dots)$.

- Find the response y of the system to input $u = (1, 1, 0, \dots)$. What do you observe?