1. Compute the z-Transform for the discrete-time signal x[n] = (0.5)nnu[n].
2. For a discrete-time signal x[n] with the z-Transform:

|  |  |  |
| --- | --- | --- |
| X(z) | = | z  8z2-2z-1 |

find the z-Transform, V(z) for the signal v[n] = e3nx[n].

1. Compute the inverse z-Transform of the transform:

|  |  |  |
| --- | --- | --- |
| X(z) | = | 4z+1  z2-z+0.5 |

1. A linear time-invariant discrete-time system is excited by the input x[n] = δ[n] + 2u[n-1]. The resulting output response with zero initial conditions is y[n]=(0.5)nu[n]. Determine the transfer function of the system.
2. Determine if the linear time-invariant continuous-time system defined by:

|  |  |  |
| --- | --- | --- |
| H(s) | = | 2s2+3s+1  s3+2s2+4 |

is stable, marginally stable, unstable, or marginally unstable.  Show work.

1. Is the linear time-invariant continuous-time system with the impulse response h(t) = sin 2t for t ≥ 0 BIBO is stable? Explain.
2. Compute the steady-state response for the linear time-invariant continuous-time system with the transfer function:

|  |  |  |
| --- | --- | --- |
| H(s) | = | s2+1  (s+1)(s2+2s+17) |

when the input is x(t) = cos(t), t ≥ 0 and no initial energy

1. The response of a system to an input is:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| y(t) | = | 8  5 | e-4t | - | 8  5 | cos(2t) | + | 16  5 | sin(2t), | t | > | 0 |

What is the steady-state response?

1. A linear time-invariant continuous-time system has transfer function:

|  |  |  |
| --- | --- | --- |
| H(s) | = | s2 + 16  (s2 + 7s + 12) |

Compute the transient response resulting from the input x(t)=2cos(4t), t>=0, with zero initial condition