Experiment No: 1   Date:01/08/2024
SIMULATION OF BASIC TEST SIGNALS
Aim

To generate continuous and discrete waveforms for the following:

1. Unit Impulse Signal
2. Bipolar Pulse Signal
3. Unipolar Pulse Signal
4. Ramp Signal
5. Triangular Signal
6. Sine Signal
7. Cosine Signal
8. Exponential Signal
9. Unit Step Signal

Theory:

1.Unit Impulse Signal:
• A signal that is zero everywhere except at one point, typically at t=0
where its value is 1.
• Mathematically $\delta(t)= \infty; t=0$ and $0; t \neq 0$

2.Bipolar Pulse Signal:
• A pulse signal that alternates between positive and negative values,
usually rectangular in shape. It switches between two constant
levels (e.g., -1 and 1) for a defined duration.
• `Mathematically p(t) = A for |t| ≤ τ/2, p(t) = 0 otherwise`

3. Unipolar Pulse Signal:
• A pulse signal that alternates between zero and a positive value. It
remains at zero for a specified duration and then jumps to a positive
constant level (e.g., 0 and 1).
• `Mathematically p(t) = A for |t| ≤ τ/2, p(t) = 0 otherwise (assuming`
A is positive)
4. Ramp Signal:
• A signal that increases linearly with time.
• Mathematically $r(t) = t; t \geq 0$ and $0; t < 0$
5.Triangular Signal:

• A periodic signal that forms a triangle shape, linearly increasing and decreasing with time, typically between a positive and negative peak.

• Mathematically: $\Lambda(t) = 1 - |t|$ for $|t| \leq 1$, $\Lambda(t) = 0$ otherwise

6. Sine Signal:

• A continuous periodic signal. It oscillates smoothly between -1 and 1.

• Mathematically: $y(t) = A\sin(2\pi ft)$

7. Cosine Signal:

• A continuous periodic signal like the sine wave but phase-shifted by $\pi\backslash 2$.

• Mathematically: $y(t) = A\cos(2\pi ft)$

8. Exponential Signal:

• A signal that increases or decreases exponentially with time. The rate of growth or decay is determined by the constant a.

• Mathematically: $e^{(at)}$

v3. Unipolar Pulse Signal:

• A pulse signal that alternates between zero and a positive value. It remains at zero for a specified duration and then jumps to a positive constant level (e.g., 0 and 1).

• **Mathematically $p(t) = A$ for $|t| \leq \tau/2$, $p(t) = 0$ otherwise (assuming** A is positive)

4. Ramp Signal:

• A signal that increases linearly with time.

• Mathematically $r(t) = t; t \geq 0$ and $0; t < 0$

5. Triangular Signal:

• A periodic signal that forms a triangle shape, linearly increasing and decreasing with time, typically between a positive and negative peak.

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8. Exponential Signal:

• A signal that increases or decreases exponentially with time. The

rate of growth or decay is determined by the constant a. • Mathematically: $e^{(at)}$ 9. Unit Step Signal: • Asignal that is zero for all negative time values and one for positive time values. • Mathematically $u(t) = 1; t \geq 0$ and $0; t < \diamond$