

Review of LTI System

LTI systems are a

(i) Linear Systems: Linear systems follow the

- Combination of additivity and homogeneity.

(ii) Time Invariant System: It follows the Time Invariance property. Any delay in the input will result to the same delay in the output.

Write $y_2(t)$ in terms of $y_1(t)$

Block diagram illustrating the relationship between two inputs, $x_1(t)$ and $x_2(t)$, and their corresponding outputs, $y_1(t)$ and $y_2(t)$, through LTI systems.

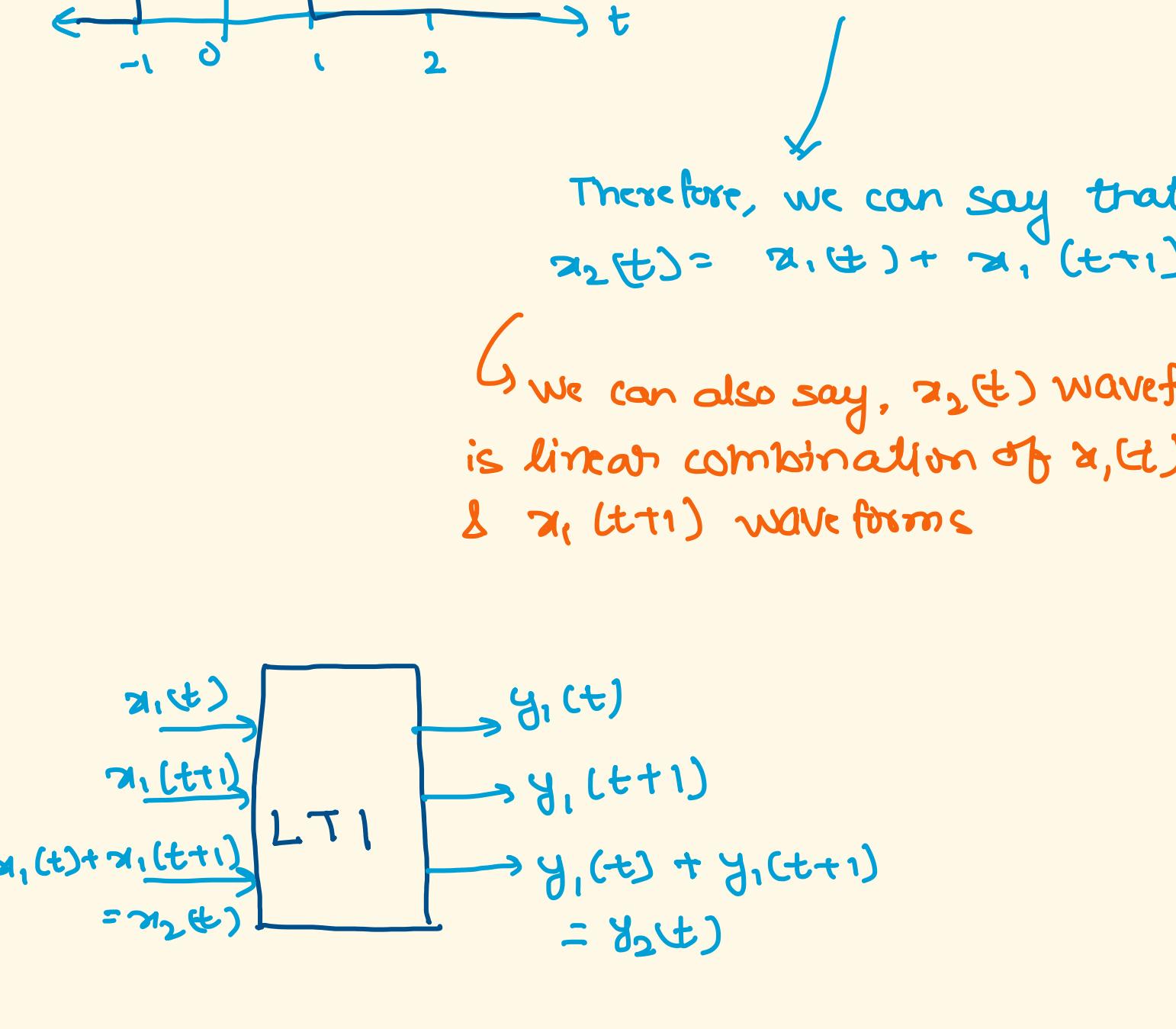
The top part shows input $x_1(t)$ (blue graph) and its response $y_1(t)$ (purple graph) through an "LTI System".

The bottom part shows input $x_2(t)$ (blue graph) and its response $y_2(t)$ (purple graph) through a "Same LTI System".

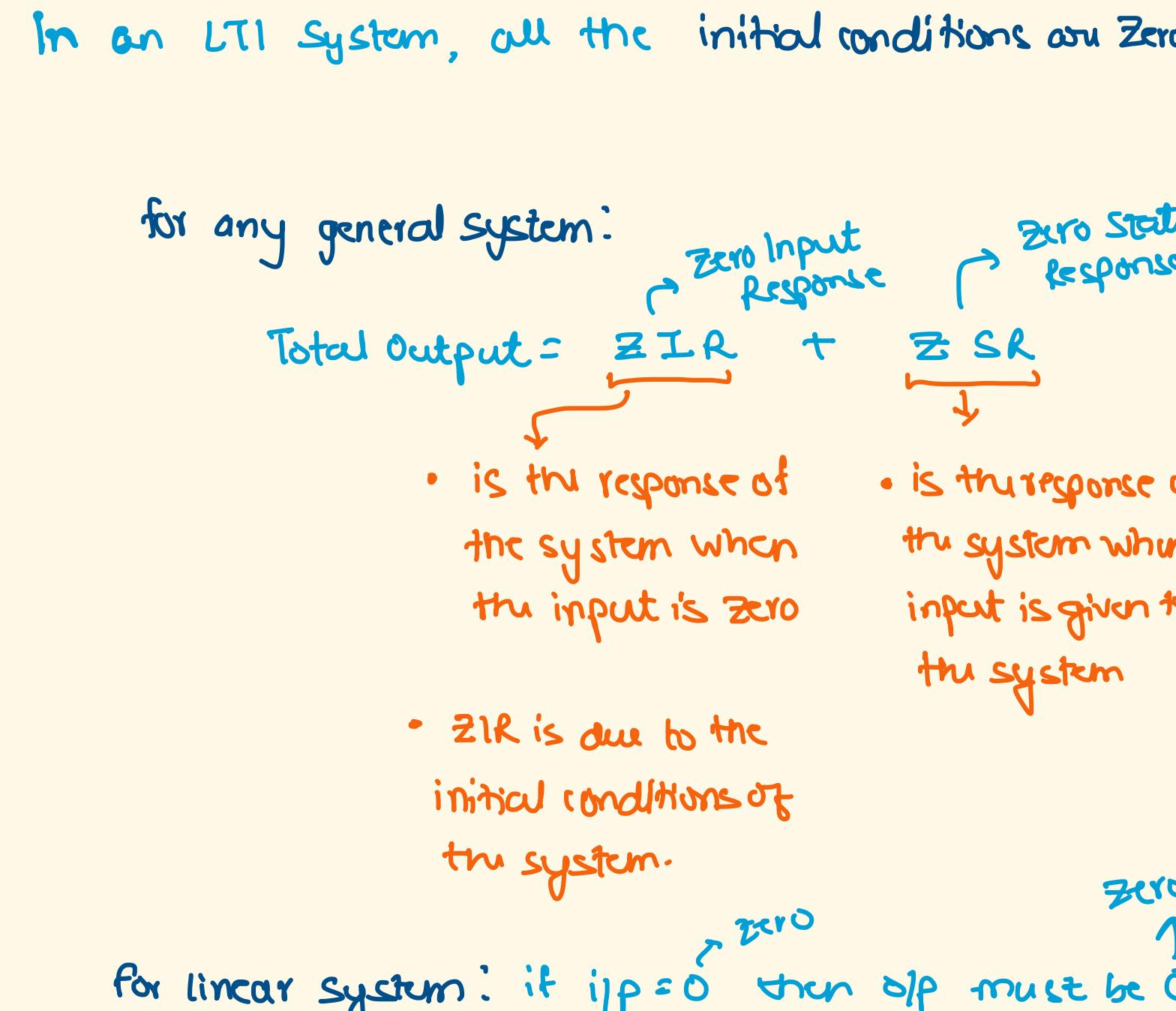
The inputs $x_1(t)$ and $x_2(t)$ are piecewise constant functions of time t .

| Time Interval | $x_1(t)$ | $x_2(t)$ |
|-----------------|----------|----------|
| $t < -1$ | 0 | 0 |
| $-1 \leq t < 0$ | 1 | 1 |
| $0 \leq t < 1$ | 1 | 2 |
| $1 \leq t < 2$ | 0 | 1 |
| $t \geq 2$ | 0 | 0 |

$u_1(t+1) \rightarrow$ left shift by 1 unit



Initial



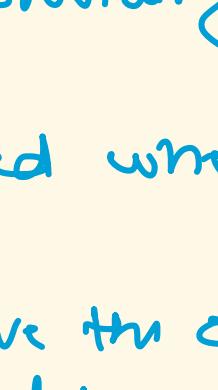
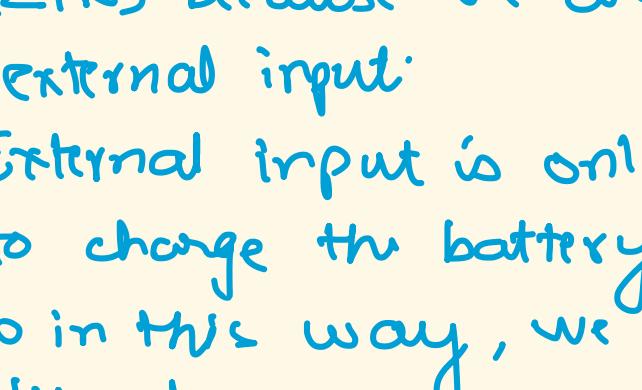
It means, for linear systems, we give input to the linear systems will come into the picture.

We all have torch lights at home.
These torch lights run on batteries inside.



stored in them which is the power source for the torch.

In this case, we are not applying any external input to the system.



STORED
FOR THIS
IN THIS

- Capacitors & initial conditions

(R) because we are not providing a
terminal input.