

- a. A linear transformation operation includes an irregular repetition of input bits if and only if it simply repeats each input a different number of times. For example, consider the operation:

$$[u_1 \ u_2 \ u_3] \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \end{bmatrix} = [u_1 \ u_1 \ u_2 \ u_2 \ u_2 \ u_3 \ u_3 \ u_3]$$

- b. A linear transformation operation includes an irregular repetition of input bits if some output bits are affected by different numbers of inputs bits. For example, consider the operation:

$$[u_1 \ u_2 \ u_3] \begin{bmatrix} 1 & 0 & 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \end{bmatrix} = [u_1 + u_3, u_2 + u_3, u_1, u_2, u_3, u_2, u_1, u_1 + u_2]$$

$\underbrace{\hspace{15em}}_G$

