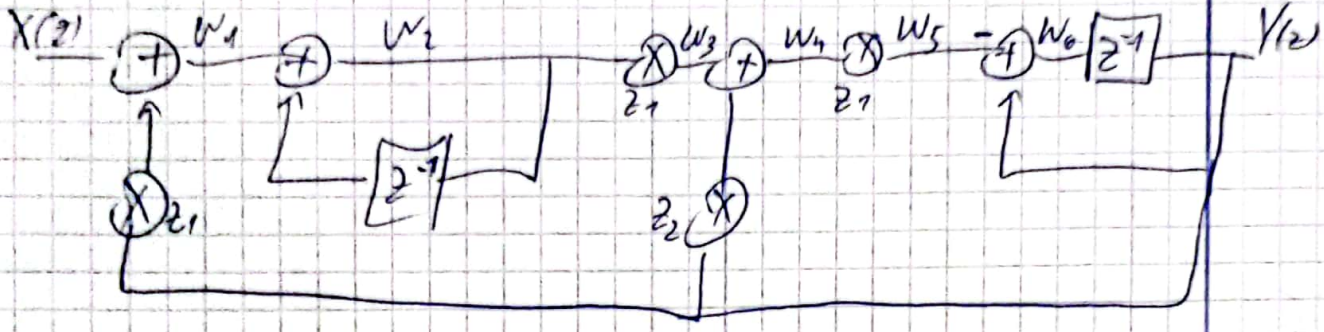
Zolzer – Non Linear Relations
Quantization Map

Block Diagrams:



$$W_1(z) = X(z) + Y(z)z_1$$

$$W_2(z) = X(z) + Y(z)z_1 + W_2(z)z^{-1}$$

$$\Rightarrow \frac{1}{1-z^{-1}}X(z) + \frac{z_1}{1-z^{-1}}Y(z)$$

$$W_3(z) = \frac{z_1}{1-z^{-1}}X(z) + \frac{z_1^2}{1-z^{-1}}Y(z)$$

$$W_4(z) = \frac{z_1}{1-z^{-1}}X(z) + \frac{z_2 - z_2z^{-1} + z_1^2}{1-z^{-1}}Y(z)$$

$$W_5(z) = \frac{z_1^2}{1-z^{-1}}X(z) + \frac{z_1z_2 - z_1z_2z^{-1} + z_1^3}{1-z^{-1}}Y(z)$$

$$W_6(z) = \frac{-z_1^2}{1-z^{-1}}X(z) + \frac{1 - z^{-1} - z_1z_2 + z_1z_2z^{-1} - z_1^3}{1-z^{-1}}Y(z)$$

$$Y(z) = \frac{-z_1^2z^{-1}}{1-z^{-1}}X(z) + \frac{z^{-1} - z^{-2} - z_1z_2z^{-1} + z_1z_2z^{-2} - z_1^3z^{-1}}{1-z^{-1}}Y(z)$$

$$\Rightarrow \frac{z_1^2z^{-1}}{1-z^{-1}}X(z) = \frac{z^{-1} - z^{-2} - z_1z_2z^{-1} + z_1z_2z^{-2} - z_1^3z^{-1} - 1 + z^{-1}}{1-z^{-1}}Y(z)$$

$$z_1^2z^{-1}X(z) = -\left(1 - (2 - z_1z_2 - z_1^3)z^{-1} + (-1 - z_1z_2)z^{-2}\right)Y(z) - z_1^2z^{-1}$$

$$H(z) = \frac{-z_1^2z^{-1}}{1 - (2 - z_1z_2 - z_1^3)z^{-1} + (-1 - z_1z_2)z^{-2}}$$

$$H(z) = \frac{N(z)}{1 - (2 - z_1z_2 - z_1^3)z^{-1} + (-1 - z_1z_2)z^{-2}}$$