An analogy: In Cartesian space,

vector $\vec{p} = (x_p, y_p, z_p)$

unit (basis) vectors: $\vec{x} = (1, 0, 0)$
$\vec{y} = (0, 1, 0)$
$\vec{z} = (0, 0, 1)$

Decomposition:

similar to $F(u) = \frac{C(u)}{2} \cdot \sum_{i=0}^{7} \cos \frac{(2i+1)u\pi}{16} \cdot f(i)$

$$x_p = \vec{x} \cdot \vec{p}$$
$$y_p = \vec{y} \cdot \vec{p}$$
$$z_p = \vec{z} \cdot \vec{p}$$

Reconstruction: similar to $f(i) = \sum_{u=0}^{7} \frac{C(u)}{2} \cos \frac{(2i+1)u\pi}{16} \cdot F(u)$

$$x_p = \vec{x} \cdot (x_p, y_p, z_p)$$
$$y_p = \vec{y} \cdot (x_p, y_p, z_p)$$
$$z_p = \vec{z} \cdot (x_p, y_p, z_p)$$

Hence, $\vec{p} = x_p \cdot \vec{x} + y_p \vec{y} + z_p \cdot \vec{z} = (x_p, y_p, z_p)$

- Similarly, a function f can be decomposed and later reconstructed using the same set of cosine basis functions in DCT and IDCT.