Q7 Coordinates-to-index and Index-to-coordinates.

7.1 2-dimension

a)

from coordinates to index : $I = X_1 + L_1 \times X_2$

from index to coordinates: $X_1 = I \bmod L_1$

$$X_2 = \left\lfloor \frac{I}{L_1} \right\rfloor = \frac{I - X_1}{L_1}$$

7.2 d-dimension

a)

from coordinates to index : $I = X_1 + L_1 \times X_2 + L_1 L_2 \times X_3 + \cdots + L_1 L_2 \cdots L_{n-1} \times X_n$

from index to coordinates: $X_1 = I \bmod L_1$

$$X_2 = \left\lfloor \frac{I \bmod (L_1 L_2)}{L_1} \right\rfloor$$

$$X_3 = \left\lfloor \frac{I \bmod (L_1 L_2 L_3)}{L_1 L_2} \right\rfloor$$

$$\cdots$$

$$X_n = \left\lfloor \frac{I \bmod (L_1 L_2 \cdots L_n)}{L_1 L_2 \cdots L_{n-1}} \right\rfloor$$