$d < D$

Compression algorithm:

input: $\{(x_i)\}_{i=1}^N$ data $x_i \in \mathbb{R}^D$, d

output: compressed data $Z \in \mathbb{R}^{N \times d}$, V_d

matrix of d principle components used to decompress

1) $\mathbb{X} \leftarrow (x_1 \dots x_N)^T$
2) $U \Sigma V \leftarrow svd(\mathbb{X})$
3) $(v_1 \dots v_D) \leftarrow V$
4) $V_d \leftarrow (v_1 \dots v_d)$
5) $Z \leftarrow (V_d^T \mathbb{X}^T)^T$
6) return Z, V_d

Decompression algorithm:

output: $\{(\tilde{x}_i)\}_{i=1}^N$ decompressed data $(\tilde{x}_i \in \mathbb{R}^D)$

input: compressed data $Z \in \mathbb{R}^{N \times d}$, V_d

same matrix obtained from compression

1) $\tilde{\mathbb{X}} \leftarrow (V_d Z^T)^T$
2) $(\tilde{x}_1 | \dots | \tilde{x}_N)^T \leftarrow \tilde{\mathbb{X}}$
3) return $\{(\tilde{x}_i)\}_{i=1}^N$