

TD 6 – LINEAR ALGEBRA

- (1) Do the columns of the following two matrices generate the same vector space?

$$B_1 = \begin{pmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 3 & 5 & 2 \end{pmatrix} \quad B_2 = \begin{pmatrix} 2 & 2 & 1 \\ 3 & 4 & 2 \\ 1 & 5 & 1 \end{pmatrix} .$$

- (2) Are the following linear maps injective or surjective?

(a) $h_3 : \mathbb{Q}^3 \rightarrow \mathbb{Q}^2, \quad (x, y, z)^t \mapsto (x + y + z, x - y - z)^t$

(b) $h_4 : \mathbb{Q}^3 \rightarrow \mathbb{Q}^3, \quad (x, y, z)^t \mapsto (x + y + z, x - y + z, x + y - z)^t$