Ex # 5.2

Q which of the following are linear combination of $u=(0,-2,2)$ and $v=(1,3,-1)$

(a) $(2,2,2)$

Solution

$u=(0,-2,2)$, $v=(1,3,-1)$, $w=(2,2,2)$

Linear combination is

$w = k_1u + k_2v$

$(2,2,2) = k_1(0,-2,2) + k_2(1,3,-1)$

$2 = 0 + k_2$

$2 = k_2$

$\boxed{k_2 = 2}$ → (i)

$2 = -2k_1 + 3k_2$

$\boxed{2k_1 - 3k_2 = -2}$ → (ii)

$2 = 2k_1 - k_2$

$\boxed{2k_1 - k_2 = 2}$ → (iii)

Substitute the value of $k_2=2$ in (ii)

$2k_1 - 3(2) = -2$

$2k_1 - 6 = -2$

$2k_1 = -2+6$

$2k_1 = 4$

$\boxed{k_1 = 2}$