$$V_{0} = \boxed{0} \boxed{1} \boxed{2}$$

$$\sigma_{1} = (1, 0, 2) \qquad \boxed{0} \qquad \boxed{0}$$

$$\sigma_{2} = (0, 2, 1) \qquad \boxed{0}$$

$$\sigma_{3} = (2, 1, 0) \qquad \boxed{2}$$