

Figure 5.1: Representation of a vector belonging to  $\mathbb{R}^2$  as a displacement in the  $x$ - $y$  plane.

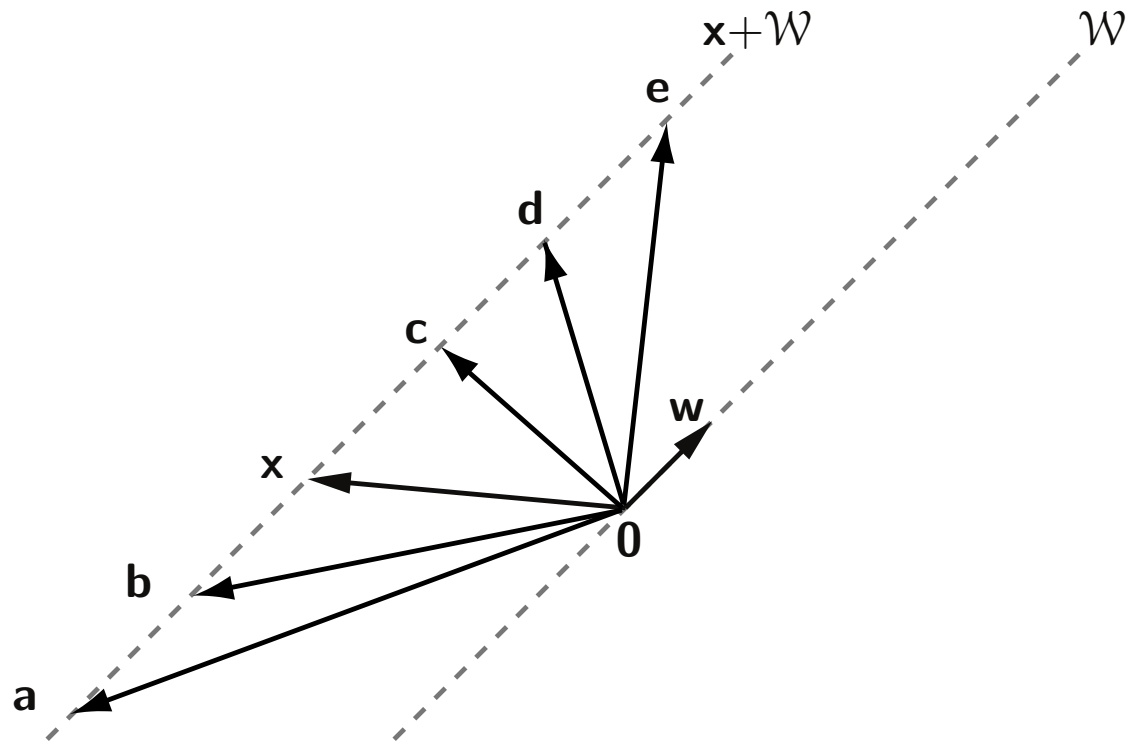


Figure 5.2: The vectors **a**, **b**, **c**, **d** and **e** belong to the affine subspace  $\mathbf{x} + \mathcal{W}$ .

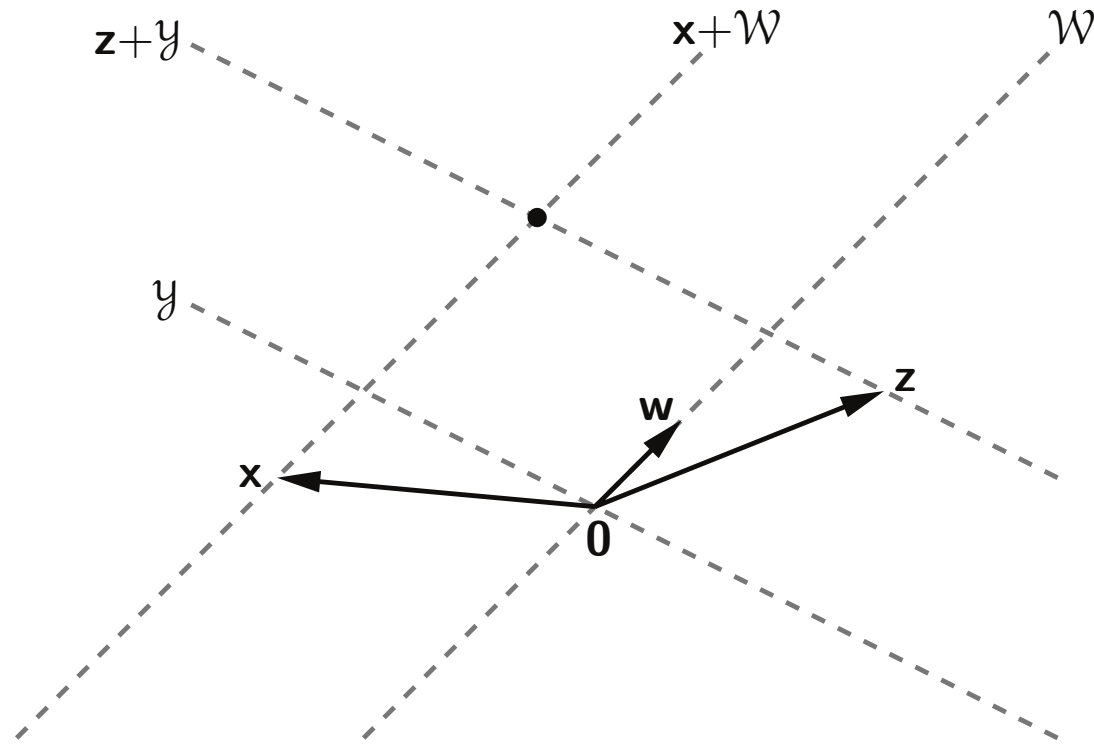


Figure 5.3: Vector and affine subspaces in the plane.

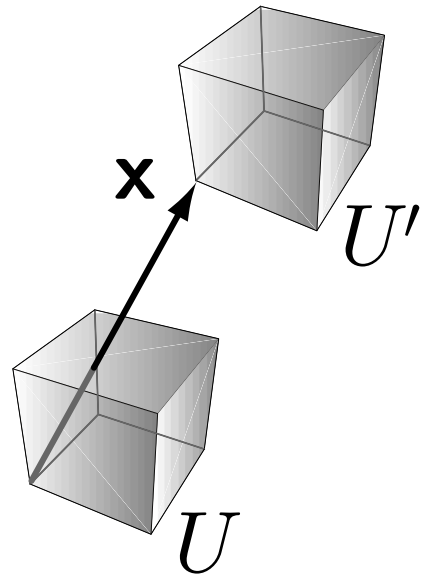


Figure 5.4:  $U$  and  $U'$  are parallel subsets of  $\mathbb{R}^3$ ;  $\mathbf{x}$  is the translation vector by which  $U \mapsto U'$ .

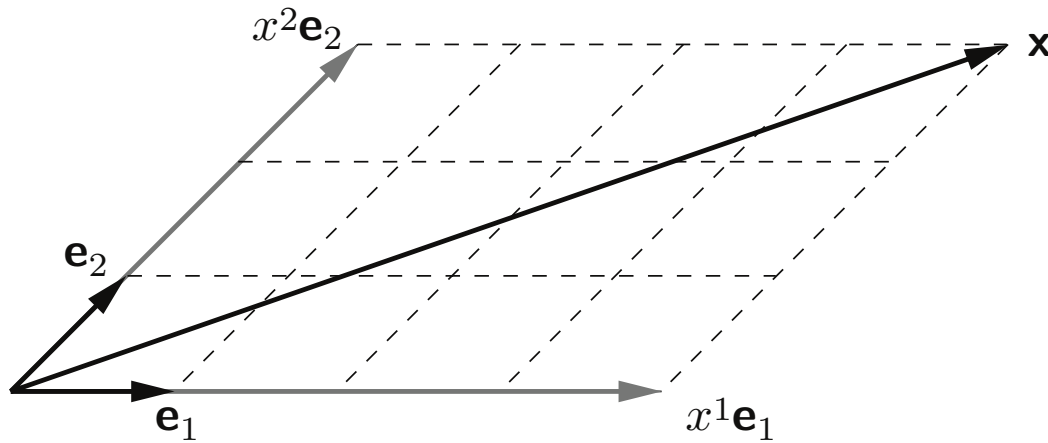


Figure 5.5: The contravariant components of a vector  $\mathbf{x} = x^1 \mathbf{e}_1 + x^2 \mathbf{e}_2 + x^3 \mathbf{e}_3$  are the coordinates of  $\mathbf{x}$  relative to axes defined by  $\mathbf{e}_1$  and  $\mathbf{e}_2$ .

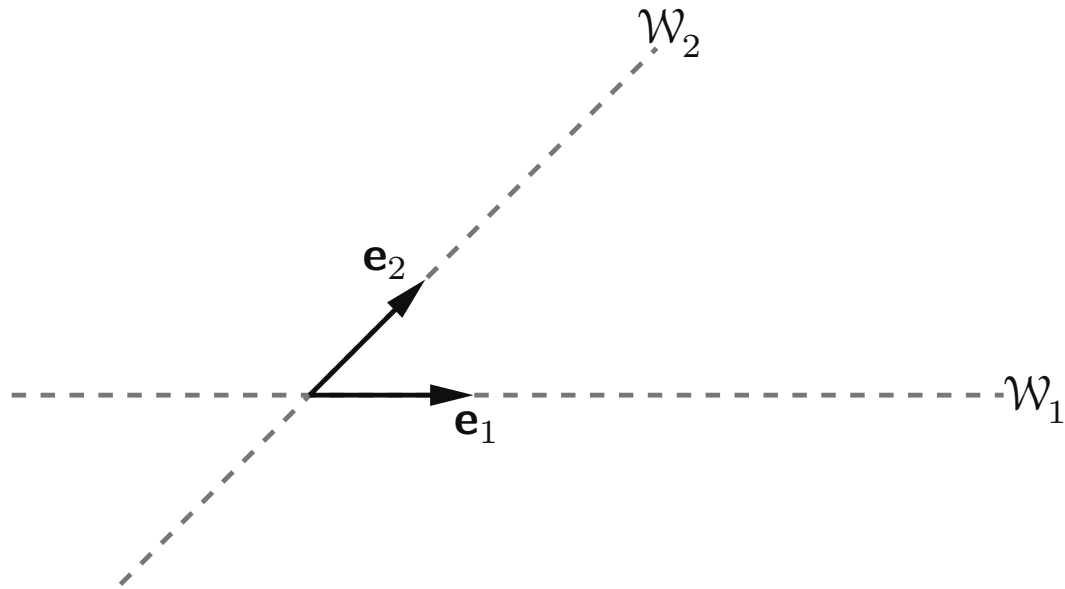


Figure 5.6:  $\mathcal{W}_1$  and  $\mathcal{W}_2$  are complementary subspaces in  $\mathbb{R}^2$ .