Example 1. Find a vector equation for the line through $(-1,2,3)$ and $(2,-2,5)$.

Example 2. Find a vector equation for the line through $(5,-6,7)$ that is parallel to the line with parametric equations $x=1+t, y=2, z=3+2 t$.

Example 3. Find the point of intersection of the lines from Examples 1 and 2.

Example 4. Show that the lines

$$
\begin{array}{ll}
L_{1}: & \langle 1+t,-3-t, 5+2 t\rangle \\
L_{2}: & \langle 4-s,-3+s, 6+2 s\rangle
\end{array}
$$

are skew (i.e. neither parallel nor intersecting).

Example 5. Find an equation for the plane containing the points $(1,2,3),(-2,4,1)$ and $(0,6,-2)$.

Example 6. Show that the planes $2 x-5 y+9 z=6$ and $4 x-10 y+11 z=0$ are not parallel. Find parametric equations for their line of intersection.

Example 7. Find a formula for the (perpendicular) distance from the point $\left(x_{1}, y_{1}, z_{1}\right)$ to the plane with equation $a x+b y+c z+d=0$.

Example 8. Find the distance between the lines of Example 4.

