Question
Find the angle between the planes $2x + 6y + z = 4$ and $x + 3y + 2z = 3$.

Answer
$2x + 6y + z = 4$ can be written:
$(x\mathbf{i} + y\mathbf{j} + z\mathbf{k}) \cdot (2\mathbf{i} + 6\mathbf{j} + \mathbf{k}) = 4$
or $\mathbf{r} \cdot \mathbf{n}_1 = D \quad (1)$
$\mathbf{r} = (x\mathbf{i} + y\mathbf{j} + z\mathbf{k}),\ \mathbf{n}_1 = (2\mathbf{i} + 6\mathbf{j} + \mathbf{k}),\ D = 4$
Now we know $\mathbf{r} \cdot \hat{\mathbf{n}}_1 = d \quad (2)$ is the vector equation of a plane with unit normal $\hat{\mathbf{n}}_1$. Thus comparing (1) and (2) we have with $\hat{\mathbf{n}}_1|\mathbf{n}_1| = \mathbf{n}_1$, $\dfrac{d}{|\mathbf{n}|} = d$.
In any case $\mathbf{n}_1$ is normal to the plane $2x+6y+z = 4$. Similarly $\mathbf{n}_2 = \mathbf{i}+3\mathbf{j}+2\mathbf{k}$ is normal to the plane $x + 3y + 2z = 3$.
The angle between two planes is given by θ, PICTURE

where $\mathbf{n}_1 \cdot \mathbf{n}_2 = |\mathbf{n}_1||\mathbf{n}_2| \cos\theta$
Thus

$$\begin{aligned}
\cos\theta &= \frac{(2,6,1)\cdot(1,3,2)}{\sqrt{2^2+6^2+1^2}\sqrt{1^2+3^2+2^2}} \\
&= \frac{2+18+2}{\sqrt{41}\sqrt{14}} \\
&= \frac{22}{\sqrt{41}\sqrt{14}} \\
\Rightarrow \theta &= \arccos\left(\frac{22}{\sqrt{41}\sqrt{14}}\right)
\end{aligned}$$