MATH 2130 – Tutorial Problems, Thu Jan 18

Lines and planes

Example. Find the equation of the plane that is perpendicular to the plane $x - y + 2z + 3 = 0$ and that contains the line $\mathbf{r} = (2, 3, -1) + t(1, 0, -2)$.

Example. Find the equation of the plane that contains the point $(0, 1, 0)$ and the line $\mathbf{r} = (1, -2, 1) + t(0, 2, 1)$, $t \in \mathbb{R}$.

Example. Let ℓ be the line $\mathbf{r} = (-\frac{1}{2}, 0, 2) + t(0, 3, 2)$, $t \in \mathbb{R}$, and let m be the line $\mathbf{r} = (1, 0, 0) + s(1, 2, 0)$, $s \in \mathbb{R}$. Show that ℓ and m intersect. Then find the vector equation of the line n that passes through this point of intersection, making right angles with both ℓ and m.

Distances

Example. Find the equations of all planes that are perpendicular to the vector $\mathbf{v} = (1, 0, -1)$ and a distance 2 from the point $P = (1, 1, 2)$.