$$|V| = \underbrace{[(x-x_0)y_2 - (y-y_0)x_2]^2}_{(\ell_3)} + \underbrace{[(x-x_0)z_2 - (z-z_0)x_2]^2}_{(\ell_2)} + \underbrace{[(y-y_0)z_2 + (z-z_0)y_2]^2}_{(\ell_1)} = 0$$

$$V = \begin{vmatrix} \ell_1 & \ell_2 & \ell_3 \\ x_2 & y_2 & z_2 \\ (x-x_0) & (y-y_0) & (z-z_0) \end{vmatrix} \Rightarrow (x_2, y_2, z_2) \;//\; (x-x_0,\ y-y_0,\ z-z_0)$$