Write down the definition of curl. Find the curl of the given vector function $\mathbf{v}=(z-y)\mathbf{i}+(x-z)\mathbf{j}+(y-x)\mathbf{k}$. [104 高應大機械乙 5(2)]

[解]設$\mathbf{v}(x, y, z)=v_1\mathbf{i}+v_2\mathbf{j}+v_3\mathbf{k}$，則

$$\text{curl }\mathbf{v}=\nabla\times\mathbf{v}=\begin{vmatrix}\mathbf{i} & \mathbf{j} & \mathbf{k}\\ \dfrac{\partial}{\partial x} & \dfrac{\partial}{\partial y} & \dfrac{\partial}{\partial z}\\ v_1 & v_2 & v_3\end{vmatrix}=\begin{vmatrix}\mathbf{i} & \mathbf{j} & \mathbf{k}\\ \dfrac{\partial}{\partial x} & \dfrac{\partial}{\partial y} & \dfrac{\partial}{\partial z}\\ z-y & x-z & y-x\end{vmatrix}=2(\mathbf{i}+\mathbf{j}+\mathbf{k})$$