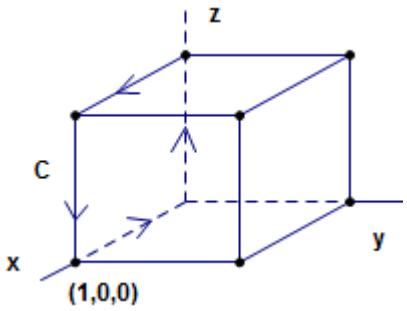
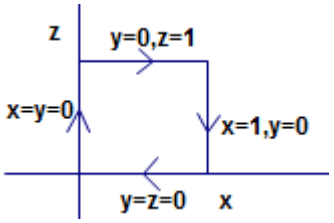
Stokes 定理習作



$F=[z^2,-y^2,0]$

驗證 $\oint_C F\cdot tds=\iint_S \vec{n}\cdot curlFdS$

$$curlF=\begin{vmatrix}\vec{i} & \vec{j} & \vec{k}\\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z}\\ z^2 & -y^2 & 0\end{vmatrix}=[0,2z,0]$$



$$\oint_C \mathrm{F}\cdot tds=\oint(F_x dx+F_y dy+F_z dz)$$

$$=\oint_C (z^2dx-y^2dy)=\int_0^1 dx=1$$

覆蓋面 S_1~S_5 只有 S_5，$\vec{n}=[0,1,0]$，積分值不為 0

$$\iint_{S_5}\vec{n}\cdot curlFdS=\int_0^1\int_0^1 2zdxdz=1$$