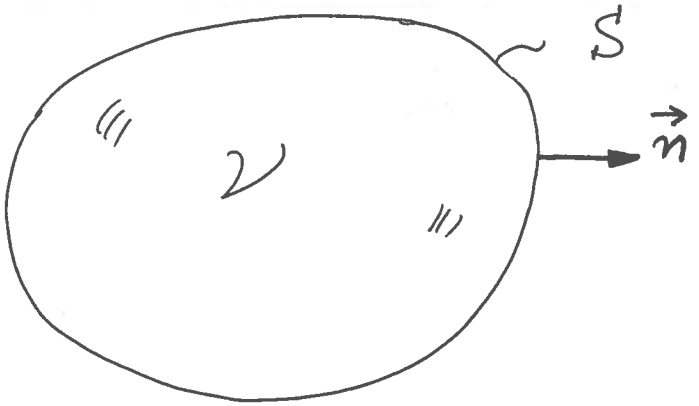
GREEN'S THEOREM

F, G: functions with continuous derivatives defined in V



(51)

$$\iint_S \left[G \frac{\partial F}{\partial n} - F \frac{\partial G}{\partial n} \right] dS = \iiint_V \left[G \nabla^2 F - F \nabla^2 G \right] dV$$

$$\iint_S \left[G \nabla F - F \nabla G \right] \vec{n}\, dS$$

$\Big\|$ ← Gauss' divergence theorem

$$\iiint_V \nabla \left[G \nabla F - F \nabla G \right] dV$$

$$\Big\| \iiint_V \left(\nabla G \nabla F + G \nabla^2 F - \nabla F \nabla G - F \nabla^2 G \right) dV$$

If $\nabla^2 F = \nabla^2 G = 0 \Longrightarrow$

$$\iint_S \left[G \frac{\partial F}{\partial n} - F \frac{\partial G}{\partial n} \right] dS = 0 \qquad (52)$$