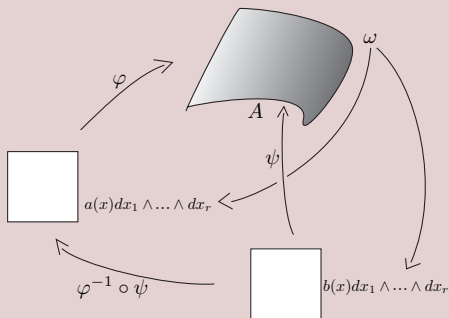


Formes différentielles :
intégration
cours Analyse II réelle

Felice Ronga

le 31 mai 2005

Changement de paramétrisation

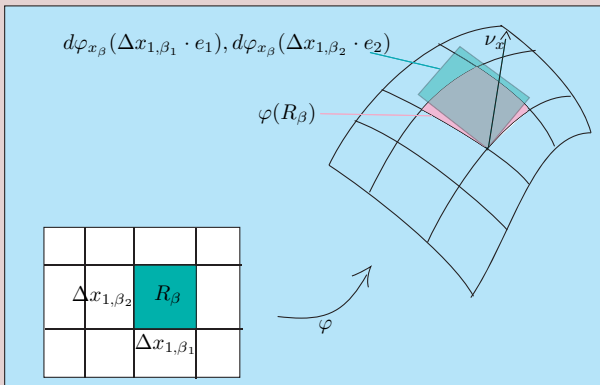


$$\varphi^*(\omega) = a(x)dx_1 \wedge \dots \wedge dx_r \quad , \quad \psi^*(\omega) = b(x)dx_1 \wedge \dots \wedge dx_r$$

$$\begin{aligned} \psi^*(\omega) &= (\varphi^{-1} \circ \psi)^* \varphi^*(\omega) = (\varphi^{-1} \circ \psi)^*(a(x)dx_1 \wedge \dots \wedge dx_r) \\ &= \det(d(\varphi^{-1}\psi)_{(x)}) a(\varphi^{-1}\psi(x)) dx_1 \wedge \dots \wedge dx_r \end{aligned}$$

$$\Rightarrow b(x) = \det(d(\varphi^{-1}\psi)_{(x)}) a(\varphi^{-1}\psi(x)) \Rightarrow \int_{\varphi} \omega = \int_{\psi} \omega$$

Interprétation de l'intégrale d'une forme différentielle



$$\int_{\varphi} \omega = \lim_{\delta(\mathcal{P}) \rightarrow 0} \sum_{\beta \in \mathcal{B}} \omega(\varphi(x_\beta))(d\varphi_{x_\beta}(\Delta x_{1,\beta_1} \cdot e_1), \dots, d\varphi_{x_\beta}(\Delta x_{r,\beta_r} \cdot e_r))$$