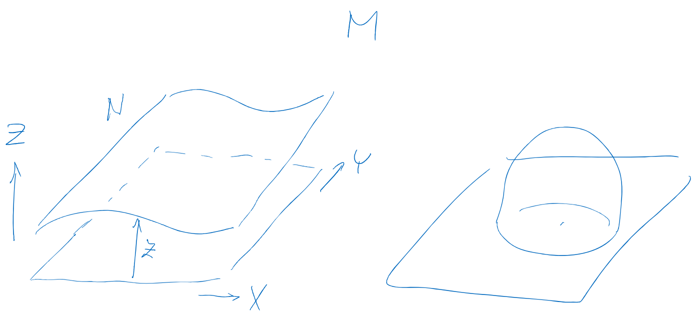
① Metrika indukovaná na podvarietu

$X = x$
$Y = y$
$Z = Z(x,y)$

$\iota : N \to M$
dim 2 dim 3
x, y X, Y, Z



$D\iota = ?$

$g = dX dX + dY dY + dZ dZ$

$g|_N = \iota^* g = ?$

$D^A_a \iota = \frac{\partial X^M}{\partial x^m} \frac{\partial^A}{\partial X^M} d_a x^m$

$Z(x,y) = \sqrt{R_0^2 - x^2 - y^2}$

ve sférických souřadnicích

$X, Y, Z \to R \; \Theta \; \Phi$

$g = dR\, dR + R^2 d\Theta\, d\Theta + R^2 \sin^2\Theta\, d\phi\, d\phi$

$g|_N = R_0^2 (d\vartheta d\vartheta + \sin^2\vartheta\, d\varphi d\varphi)$

$R = R_0 \leftarrow$ $\quad \iota^* dR = 0$
$\Theta = \vartheta$ $\quad \iota^* d\Theta = d\vartheta$
$\Phi = \varphi$ $\quad \iota^* d\phi = d\varphi$

② Rotačně symetrické plocha

$\iota : N \to M$
2 3

$P \; \Phi \; Z$

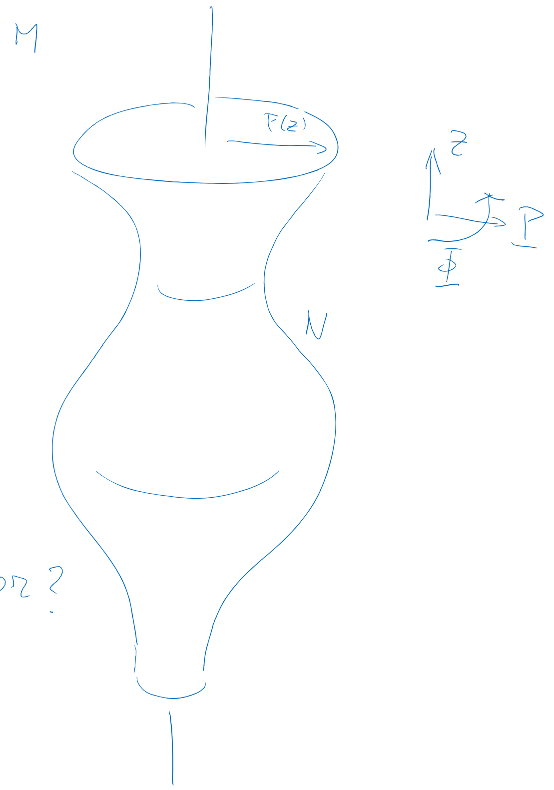
$g = dP\, dP + dZ\, dZ + P^2 d\Phi\, d\Phi$

$Z = z$
$\Phi = \varphi$
$P = P(z)$

$q = g|_N = \iota^* g =$

kdy je $\frac{\partial}{\partial Z}$ konformní Killingův vektor?

$\mathcal{L}_{\frac{\partial}{\partial z}} q \overset{?}{=} \alpha\, q$



③ $g = d\vartheta^2 + \sin^2\vartheta\, d\varphi^2$

$\mathcal{L}_X g = ?$ $\quad X = -\sin\varphi \frac{\partial}{\partial\vartheta} - \cos\varphi \cot\vartheta \frac{\partial}{\partial\varphi}$

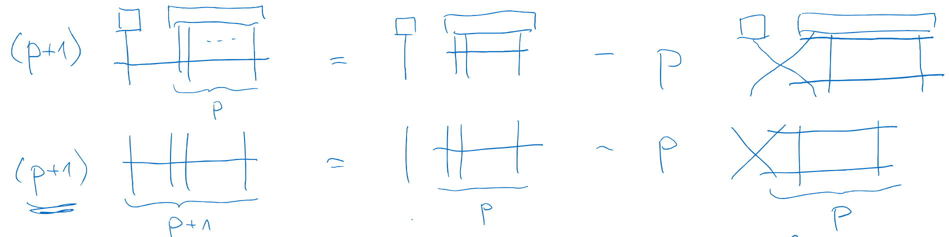
$\mathcal{L}_Y g = ?$ $\quad Y = \cos\varphi \frac{\partial}{\partial\vartheta} - \sin\varphi \cot\vartheta \frac{\partial}{\partial\varphi}$

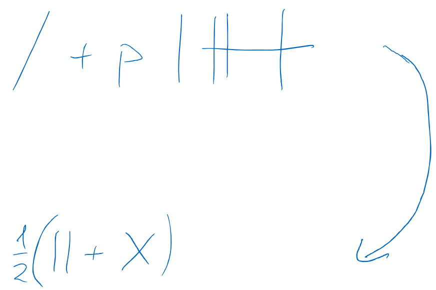
$\mathcal{L}_Z g = ?$ $\quad Z = \frac{\partial}{\partial\varphi}$

AS tenzory

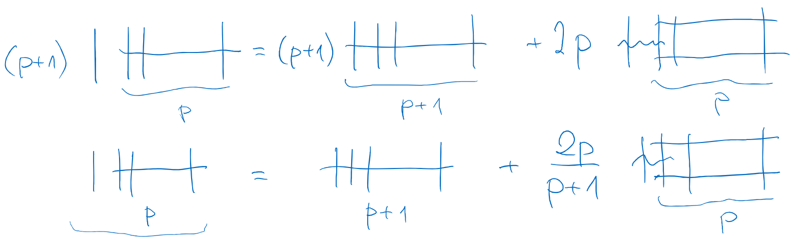
$$\alpha_a \wedge \omega_{a_1\dots a_p} = \alpha_a\,\omega_{a_1\dots a_p} - p\,\alpha_{[a_1}\,\omega_{|a|a_2\dots a_p]}$$

$$= \alpha_a\,\omega_{a_1\dots a_p} - \alpha_{a_1}\,\omega_{a a_2\dots a_p} + \alpha_{a_2}\,\omega_{a a_1 a_3\dots a_p} - \dots\ \alpha_{a_p}\,\omega_{a a_1\dots a_{p-1}}$$





$$(p+1)\;{}^{[p+1]}\delta^{b_0\,\dots\,b_p}_{a_0\,\dots\,a_p} = \delta^{b_0}_{a_0}\;{}^{[p]}\delta^{b_1\,\dots\,b_p}_{a_1\,\dots\,a_p} - p\;\delta^{[b_1}_{a_0}\,\delta^{|b_0|}_{[a_1}\,\delta^{b_2}_{a_2}\dots\delta^{b_p]}_{a_p]}$$



$${}^{(1)[p]}\delta = A + S$$ ← rozštěpení na podprostory

$$\omega_{a a_1\dots a_p} = \alpha_{(a) a_1\dots a_p} + \sigma_{a[a_1\ \ a_p]}$$

$A\omega$ $\qquad$ $S\omega$

$$\sigma_{a a_1\ \ a_p} = \frac{2p}{p+1}\,\omega_{(a a_1) a_2\dots a_p} \qquad \alpha_{a a_1\dots a_p} = \omega_{[a a_1\dots a_p]}$$

$$\omega_{a\boxed{a_1\dots a_p}} \to \alpha_{\boxed{a a_1\dots a_p}} \oplus \sigma_{\boxed{a a_1}\boxed{a_2\ \ a_p}}$$

informace v ω je ekvivalentní informaci v α a σ

$A^2 = A \qquad S^2 = S$ ← dokažte!