

Kovariantní derivace

na vektorovém bundlu

$$\phi, \psi \in \text{Sect } AM \quad f \in \mathcal{F}M$$

$$AM \quad \xi, \zeta \in TM$$

D_ξ kovar. der na AM
ve směru $\xi \in TM$

$$D_\xi : \text{Sect } AM \rightarrow \text{Sect } AM$$

$D_\xi \phi$ je dáno zmalostí ϕ na
 x libov. okolí U bodu $x \in M$

$$D_\xi(\phi + \psi) = D_\xi \phi + D_\xi \psi$$

$$D_\xi(f\phi) = f D_\xi \phi + (\xi \cdot df) \phi$$

$$D_{f\xi} \phi = D_\xi \phi + f D_\xi \phi$$

Kovariantní diference

$$D_\xi \phi = \xi \cdot D\phi$$

$$D_\xi \phi^A = \xi^m D_m \phi^A$$

$$D_m \phi^A$$

rozšíření na tens. bundle

$$D(\phi \otimes \psi) = (D\phi) \otimes \psi + \phi \otimes (D\psi)$$

$$D C \phi = C D \phi$$

$$Df = df$$

Kovariantní derivace na vektorovém bundlu

$\phi, \psi \in \text{Sect } AM$ $f \in FM$
 $\xi, \zeta \in TM$

D_ξ kovar. der. na AM
ve směru $\xi \in TM$

$$D_\xi : \text{Sect } AM \rightarrow \text{Sect } AM$$

$D_\xi \phi|_x$ je dáno znalostí ϕ na
libov. okolí U bodu $x \in M$

$$D_\xi(\phi + \psi) = D_\xi \phi + D_\xi \psi$$

$$D_\xi(f\phi) = f D_\xi \phi + (\xi \cdot df) \phi$$

$$D_{\xi + f\zeta} \phi = D_\xi \phi + f D_\zeta \phi$$

Kovariantní diference.

$$D_{\xi} \phi = \xi \cdot D \phi$$

$$D_{\xi} \phi^A = \xi^B D_B \phi^A$$

$$D_B \phi^A$$

ποζιτίβη με tens. bundle

$$D(\phi \otimes \psi) = (D\phi) \otimes \psi + \phi \otimes (D\psi)$$

$$D C \phi = C D \phi$$

$$Df = df$$

NOTA: kov. derivace

\tilde{D}, \tilde{D} kov. der. na AM

$$\tilde{D}\phi - D\phi = A \cdot \phi$$

$$\tilde{D}_m \phi^A - D_m \phi^A = A_{m \ B}^A \phi^B$$

$$\tilde{D}T - DT = AT$$

$$A_{B \ C}^{AB} = A_{B \ D}^A T_{C \ D}^{DB} + A_{C \ D}^B T_{B \ D}^{DB} + \dots \\ - A_{B \ C}^M T_{M \ D}^{DB} - A_{C \ D}^M T_{M \ B}^{DB} - \dots$$

$$P_T: A_m M^A_B = A_{m \ N}^A M^N_B - A_{m \ B}^N M^A_N$$

$$A_m M = [A_m, M]$$

trivializace

E_A báze u AM

$$\partial E_A = 0 \quad \partial E^A = 0$$

$$\phi = \phi^A E_A$$

$$\partial \phi = (d\phi^A) \otimes E_A$$

$$\partial_m \phi^A = (\partial \phi)_m^A = \phi^A_{,m}$$

$$D = \partial + A \quad A_{m \ B}^A$$

M pseudoderivace $A_{\otimes}^{\otimes} M$

$M: \text{Sect } A_{\otimes}^{\otimes} M \rightarrow \text{Sect } A_{\otimes}^{\otimes} M$

$$M(\phi + \eta \psi) = M\phi + \eta M\psi$$

$$M(\phi \psi) = (M\phi)\psi + \phi(M\psi)$$

$$M c \phi = c M \phi$$

$$M f = 0$$

$$M T_{B \dots}^A \dots = M^A_N T_{B \dots}^N \dots + \dots - M^N_B T_{N \dots}^A \dots$$

$$M \phi^A = M^A_{\ N} \phi^N$$

Notah kov. derivaci

\tilde{D}, \tilde{D} kov. der. na AM

$$\tilde{D}\phi - D\phi = A \cdot \phi$$

$$\tilde{D}_m \phi^A - D_m \phi^A = A_{mB}^A \phi^B$$

$$\tilde{D}T - DT = AT$$

$$A_{BC}^A T_{CD}^{AB} = A_{mM}^A T_{CD}^{MB} + A_{mM}^B T_{CD}^{AM} + \dots - A_{BC}^M T_{CD}^{AB} - A_{BC}^N T_{CD}^{AB} - \dots$$

$$P.F. \quad A_B M^A = A_{mN}^A M^N - A_{mB}^N M^A$$

$$A_m M = [A_m, M]$$

trivialisace

E_A báze v AM

$$\partial E_A = 0 \quad \partial E^A = 0$$

$$\phi = \phi^A E_A$$

$$\partial \phi = (d\phi^A) \otimes E_A$$

$$\partial_m \phi^A = (\partial \phi)_m^A = \phi^A_{|m}$$

$$D = \partial + A \quad A_{m \ B}^A$$

M pseudodifferential $A_e^s M$

$M : \text{Sect } A_e^s M \rightarrow \text{Sect } A_e^s M$

$$M(\phi + \psi) = M\phi + M\psi$$

$$M(\phi \psi) = (M\phi)\psi + \phi(M\psi)$$

$$M \partial \phi = \partial M\phi$$

$$Mf = 0$$

$$M T_{B \dots}^A \dots = M_{N \dots}^A T_{B \dots}^N \dots + \dots - M_{B \dots}^N T_{N \dots}^A \dots$$

$$M \phi^A = M_{N \dots}^A \phi^N$$