

$$?? \quad ?$$

$$??$$

$$S^{\tau}S^{\tau}\in$$

$$\overline{\mathcal{T}}\overline{\mathcal{T}}$$

$$\tau S\tau?A_2^1A_2T_2T_2SxySxyxUyVUVU\cap$$

$$V = SXA_2, T_2$$

$$rC^0C^1rrC^rr\geq$$

$$1rrC^\infty$$

$$\{X,\tau_X\}\{Y,\tau_Y\}f:$$

$$X\rightarrow$$

$$f$$

$$f^{-1}f$$

$$C^rMA_2,T_2M\{U_\alpha\},\alpha\in\Gamma\varphi_\alpha:$$

$$U_\alpha\overset{\rightarrow}{\rightarrow}$$

$$\varphi_\alpha(U_\alpha)$$

$$\varphi_\alpha^{\alpha}:$$

$$U_\alpha\overset{\rightarrow}{\rightarrow}$$

$$\varphi_\alpha(U_\alpha)\subset$$

$$R^nU_\alpha\varphi_\alpha(U_\alpha)^3$$

$$U_\alpha\cap$$

$$U_\beta\neq$$

$$\varphi_\beta\circ\varphi_\alpha^{-1}:\varphi_\alpha(U_\alpha\cap U_\beta)\rightarrow\varphi_\beta(U_\alpha\cap U_\beta)$$

$$C^r(r\geq$$

$$1)MC^r$$

$$\overline{r}$$

$$0\overline{M}r>$$

$$1MC^r\mathcal{D}=$$

$$\{(U_{\alpha\in\Gamma},\varphi_\alpha)\}\mathcal{D}M(U,\varphi)\mathcal{D}C^{r4}(U,\varphi)\mathcal{D}\mathcal{D}MC^r?$$

$$C^\infty(M)M$$

$$p\in$$

$$M$$

$$X_p:$$

$$C^\infty(M)\rightarrow$$

$$R$$

$$X_p(f\circ g)=X_p(g)f(p)+g(p)X_p(f),\forall f,g\in C^\infty(M)$$

$$X_pppT_pM$$

$$p\in$$

$$MMp\sigma:$$

$$(-a,a)\rightarrow$$

$$M$$

$$\sigma(0)=$$

$$p\sigma'(0)$$

$$\sigma'(0)f=\frac{d}{dt}|_{t=0}[f\circ\sigma(t)],\forall f\in C^\infty(M).$$

$$\sigma'(0)\in$$

$$T_pM$$

$$\dot{\sigma}(0)$$

$$p\in$$

$$M$$

$$g_p:$$

$$T_p^R M\times$$

$$T_p^R M\rightarrow$$

$$R$$

$$\forall x_p\in$$

$$T_pM,g_p(x_p,x_p)\geq$$

$$0x_p=$$

$$0$$

$$\forall x_p,y_p\in$$

$$T_pMg_p(x_p,y_p)=$$

$$g_p(y_p,x_p)$$

$$gM(M,g)$$

$$\sigma(t):$$

$$[a,b]\rightarrow$$

$$M(M,g)p,qC^1t\in$$

$$[a,b]\sigma$$

$$L(\sigma)=\int_a^b\|\dot{\sigma}(t)\|dt$$