

$$2 \sum_{k\ell} \sum_i \bar{\zeta}_j^{\ell} \zeta_k^{\ell} = \sum_i \zeta_{kj} - \sum_j \zeta_{ki} + \sum_k \zeta_{ij}$$

$$g_{ij} = \varrho^2 g_{ij} \text{ neue metric}$$

$${}_{i\,j}^{\bar{\mathfrak{U}}}\mathfrak{H}^\ell - {}_{i\,j}^{\bar{\mathfrak{U}}} \mathfrak{H}^\ell = \widehat{{}_{i\,\underline{\varrho}}\mathfrak{U}^\ell} \delta_j + \widehat{{}_{j\,\underline{\varrho}}\mathfrak{U}^\ell} \delta_i - \underline{\partial}^k \varrho {}_{ij}^{\mathfrak{U}}$$

$$2\varrho^2 \sum_{k\ell} \overbrace{\bar{\zeta}_j^\ell \zeta_j^\ell - \bar{\zeta}_j^\ell \zeta_k^\ell} = 2 \sum_{k\ell} \zeta_j^\ell \bar{\zeta}_j^\ell \zeta_\ell^\ell - 2\varrho^2 \sum_{k\ell} \zeta_j^\ell \bar{\zeta}_j^\ell \zeta_k^\ell$$

$$= {}_{i-} \mathfrak{l}_{kj} + {}_{j-} \mathfrak{l}_{ki} - {}_{k-} \mathfrak{l}_{ij} - \varrho^2 \overbrace{{}_{i-} \mathfrak{l}_{kj} + {}_{j-} \mathfrak{l}_{ki} - {}_{k-} \mathfrak{l}_{ij}}$$

$$= i \cancel{\underline{\varrho}} \widehat{\underline{\varrho}^2 \cancel{\underline{\varrho}}} + j \cancel{\underline{\varrho}} \widehat{\underline{\varrho}^2 \cancel{\underline{\varrho}}} - k \cancel{\underline{\varrho}} \widehat{\underline{\varrho}^2 \cancel{\underline{\varrho}}} - \underline{\varrho}^2 \widehat{i \cancel{\underline{\varrho}} + j \cancel{\underline{\varrho}} - k \cancel{\underline{\varrho}}}$$

$$= \overbrace{\underline{\varrho^2}}_{kj} \overbrace{\underline{\varrho^2}}_{ki} + \overbrace{\underline{\varrho^2}}_{ij} \overbrace{\underline{\varrho^2}}_{ki} - \overbrace{\underline{\varrho^2}}_{ij} \overbrace{\underline{\varrho^2}}_{kj} = 2\underline{\varrho} \overbrace{\underline{\varrho}}_{kj} \overbrace{\underline{\varrho}}_{ki} + \overbrace{\underline{\varrho}}_{ij} \overbrace{\underline{\varrho}}_{ki} - \overbrace{\underline{\varrho}}_{ij} \overbrace{\underline{\varrho}}_{kj}$$

$$\Rightarrow {}_{i\bar{j}}^{\bar{i}} \mathfrak{H}^\ell - {}_{i\bar{j}}^{\bar{i}} \mathfrak{H}^\ell = \mathfrak{H}^{\ell k} \left(\overline{{}_{i\bar{k}}\varrho} \mathfrak{H}_{kj} + \overline{{}_{j\bar{k}}\varrho} \mathfrak{H}_{ki} - \overline{{}_{k\bar{j}}\varrho} \mathfrak{H}_{ij} \right) = \overline{{}_{i\bar{k}}\varrho}^{\ell k} \mathfrak{H}_{kj} + \overline{{}_{j\bar{k}}\varrho}^{\ell k} \mathfrak{H}_{ki} - \mathfrak{H}^{\ell k} \overline{{}_{k\bar{j}}\varrho}_{ij} = \overline{{}_{i\bar{k}}\varrho}^\ell \delta_j + \overline{{}_{j\bar{k}}\varrho}^\ell \delta_i - \underline{\partial^k \varrho}^\ell$$

$$2 \sum_{k\ell} \left[\sum_i \sum_j \bar{\eta}_i^\ell \eta_k^\ell \right] = \sum_i \sum_{kj} \eta_i^\ell + \sum_j \sum_{ki} \eta_i^\ell - \sum_k \sum_{ij} \eta_i^\ell$$

$$\mathfrak{H}_{ij} = \varrho^2 \mathfrak{H}_{ij} \quad \text{neue metric}$$

$${}_{i\bar{j}}\bar{\mathsf{H}}^{\ell} - {}_{\bar{i}j}\bar{\mathsf{H}}^{\ell} = \widehat{{}_i\mathsf{D}\varrho}^{\ell} \delta_j + \widehat{{}_j\mathsf{D}\varrho}^{\ell} \delta_i - \underline{\partial^k \varrho}_{ij} \mathsf{H}$$

$$2\varrho^2 \sum_{k\ell} \overbrace{i_j \bar{\eta}_k^\ell - i_j \bar{\eta}_k^\ell} = 2 \sum_{k\ell} i_j \bar{\eta}_k^\ell - 2\varrho^2 \sum_{k\ell} i_j \bar{\eta}_k^\ell$$

$$= {}_i \nabla_{kj} \bar{u}_i + {}_j \nabla_{ki} \bar{u}_j - {}_k \nabla_{ij} \bar{u}_k - \varrho^2 \overline{{}_i \nabla_{kj} u_i + {}_j \nabla_{ki} u_j - {}_k \nabla_{ij} u_k}$$

$$= \underset{i}{\mathop{\boxplus}} \overline{\rho^2 \eta_{kj}} + \underset{j}{\mathop{\boxplus}} \overline{\rho^2 \eta_{ki}} - \underset{k}{\mathop{\boxplus}} \overline{\rho^2 \eta_{ij}} - \rho^2 \overline{\underset{i}{\mathop{\boxplus}} \eta_{kj} + \underset{j}{\mathop{\boxplus}} \eta_{ki} - \underset{k}{\mathop{\boxplus}} \eta_{ij}}$$

$$= \overbrace{\quad}^i \overbrace{\varphi \varrho^2}^{kj} \overbrace{\quad}^j + \overbrace{\quad}^j \overbrace{\varphi \varrho^2}^{ki} \overbrace{\quad}^k - \overbrace{\quad}^k \overbrace{\varphi \varrho^2}^{ij} \overbrace{\quad}^i = 2\varrho \overbrace{\quad}^i \overbrace{\varphi \varrho}^{kj} + \overbrace{\quad}^j \overbrace{\varphi \varrho}^{ki} - \overbrace{\quad}^k \overbrace{\varphi \varrho}^{ij}$$

$$\Rightarrow {}_{i\bar{j}}^{\bar{i}} \mathsf{H}^\ell - {}_{i\bar{j}}^{\bar{i}} \mathsf{H}^\ell = \mathsf{H}^{\ell k} \left({}_{i\bar{k}\bar{j}}^{\bar{i}\bar{k}\bar{j}} \mathsf{H} + {}_{j\bar{k}\bar{i}}^{\bar{j}\bar{k}\bar{i}} \mathsf{H} - {}_{k\bar{i}\bar{j}}^{\bar{k}\bar{i}\bar{j}} \mathsf{H} \right) = {}_{i\bar{k}\bar{j}}^{\bar{i}\bar{k}\bar{j}} \mathsf{H}^{\ell k} + {}_{j\bar{k}\bar{i}}^{\bar{j}\bar{k}\bar{i}} \mathsf{H}^{\ell k} - {}_{k\bar{i}\bar{j}}^{\bar{k}\bar{i}\bar{j}} \mathsf{H}^{\ell k} = {}_{k\bar{i}\bar{j}}^{\bar{k}\bar{i}\bar{j}} \mathsf{H}^{\ell k} = {}_{i\bar{k}\bar{j}}^{\bar{i}\bar{k}\bar{j}} \mathsf{Q}^\ell \delta_j + {}_{j\bar{k}\bar{i}}^{\bar{j}\bar{k}\bar{i}} \mathsf{Q}^\ell \delta_i - \partial^k \mathsf{Q}^\ell$$

lictup tangent metric cisformations

$$2 \underset{k\ell}{\mathfrak{A}} \underset{i\,j}{\bar{\mathfrak{A}}} \underset{\ell}{\mathfrak{A}} = {}_i \partial \underset{kj}{\mathfrak{A}} + {}_j \partial \underset{ki}{\mathfrak{A}} - {}_k \partial \underset{ij}{\mathfrak{A}}$$

$$\mathcal{A}_{ij} = \varrho^2 \mathcal{A}_{ij}$$

$${}_{ij}^{\bar{A}} \mathfrak{H}^\ell - {}_{ij}^{\bar{A}} \mathfrak{H}^\ell = \widehat{{}_i \partial \varrho}^\ell \delta_j + \widehat{{}_j \partial \varrho}^\ell \delta_i - \underline{\partial^k \varrho} {}_{ij}^A$$

$$2 \varrho^2 \overline{\mathfrak{h}}_{kl} \overline{\mathfrak{h}}_{ij}^\ell - \overline{\mathfrak{h}}_{ij} \overline{\mathfrak{h}}_{kl}^\ell = 2 \overline{\mathfrak{h}}_{kl} \overline{\mathfrak{h}}_{ij}^\ell - 2 \varrho^2 \overline{\mathfrak{h}}_{kl} \overline{\mathfrak{h}}_{ij}^\ell$$

$$= {}_i\partial_{\overrightarrow{kj}} \mathbf{\Lambda}_i + {}_j\partial_{\overleftarrow{ki}} \mathbf{\Lambda}_i - {}_k\partial_{\overleftarrow{ij}} \mathbf{\Lambda}_i - \varrho^2 \overrightarrow{{}_i\partial \mathbf{\Lambda}_{kj} + {}_j\partial \mathbf{\Lambda}_{ki} - {}_k\partial \mathbf{\Lambda}_{ij}}$$

$$= {}_i\partial \overline{\varrho^2 \Delta_{kj}} + {}_j\partial \overline{\varrho^2 \Delta_{ki}} - {}_k\partial \overline{\varrho^2 \Delta_{ij}} - \varrho^2 \overline{{}_i\partial \Delta_{kj} + {}_j\partial \Delta_{ki} - {}_k\partial \Delta_{ij}}$$

$$= \overbrace{i}^{\partial \varrho^2} \overbrace{kj}^{\mathbf{A}} + \overbrace{j}^{\partial \varrho^2} \overbrace{ki}^{\mathbf{A}} - \overbrace{k}^{\partial \varrho^2} \overbrace{ij}^{\mathbf{A}} = 2\varrho \overbrace{i}^{\partial \varrho} \overbrace{kj}^{\mathbf{A}} + \overbrace{j}^{\partial \varrho} \overbrace{ki}^{\mathbf{A}} - \overbrace{k}^{\partial \varrho} \overbrace{ij}^{\mathbf{A}}$$

$$\Rightarrow \underset{i,j}{\mathfrak{H}} \underset{j}{\mathfrak{H}^{\ell}} - \underset{i,j}{\mathfrak{H}} \underset{i}{\mathfrak{H}^{\ell}} = \mathfrak{H}^{ek} \underset{i}{\overset{\sim}{\partial \varrho}} \underset{kj}{\mathfrak{H}} + \underset{j}{\overset{\sim}{\partial \varrho}} \underset{ki}{\mathfrak{H}} + \underset{k}{\overset{\sim}{\partial \varrho}} \underset{ij}{\mathfrak{H}} = \underset{i}{\overset{\sim}{\partial \varrho}} \underset{kj}{\mathfrak{H}^{ek}} \underset{kj}{\mathfrak{H}} + \underset{j}{\overset{\sim}{\partial \varrho}} \underset{ki}{\mathfrak{H}^{ek}} \underset{ki}{\mathfrak{H}} - \mathfrak{H}^{ek} \underset{k}{\overset{\sim}{\partial \varrho}} \underset{ij}{\mathfrak{H}} = \underset{i}{\overset{\sim}{\partial \varrho}} \underset{\ell}{\delta_j} + \underset{j}{\overset{\sim}{\partial \varrho}} \underset{\ell}{\delta_i} - \underset{k}{\overset{\sim}{\partial \varrho}} \underset{ij}{\mathfrak{H}}$$

$$2 \underset{k\ell}{\underset{i}{\underset{j}{\text{A}}}} \underset{\ell}{\text{A}} = \underset{i}{\text{V}} \underset{kj}{\text{A}} + \underset{j}{\text{V}} \underset{ki}{\text{A}} - \underset{k}{\text{V}} \underset{ij}{\text{A}}$$

$$\mathcal{A}_{ij} = \varrho^2 \mathcal{A}_{ij}$$

$${}_{i\,j}^{\bar{\mathfrak{A}}}\, {}^{\mathfrak{A}}_{\mathfrak{H}}^{\ell} - {}_{i\,j}^{\bar{\mathfrak{A}}}\, {}^{\mathfrak{H}}_{\mathfrak{A}}^{\ell} = \widehat{{}_{i\,-}\varrho}^{\ell} \delta_j + \widehat{{}_{j\,-}\varrho}^{\ell} \delta_i - \underbrace{{}_{-\,\mathfrak{A}}^k \varrho}_{ij} {}^{\mathfrak{A}}_{\mathfrak{H}}$$

$$2\varrho^2 \overbrace{\mathfrak{A}_{kl} \bar{\mathfrak{A}}_{ij}^\ell - \bar{\mathfrak{A}}_{kl} \mathfrak{A}_{ij}^\ell} = 2\mathfrak{A}_{kl} \bar{\mathfrak{A}}_{ij}^\ell - 2\varrho^2 \mathfrak{A}_{kl} \bar{\mathfrak{A}}_{ij}^\ell$$

$$= i \sum_{k,j} \frac{\partial}{\partial x_k} + j \sum_{k,i} \frac{\partial}{\partial x_i} - k \sum_{i,j} \frac{\partial}{\partial x_j} - \varrho^2 \left(i \sum_{k,j} \frac{\partial}{\partial x_k} + j \sum_{k,i} \frac{\partial}{\partial x_i} - k \sum_{i,j} \frac{\partial}{\partial x_j} \right)$$

$$= i \cancel{\underline{\rho^2}_{kj}} + j \cancel{\underline{\rho^2}_{ki}} - k \cancel{\underline{\rho^2}_{ij}} - o^2 \cancel{\underline{\rho^2}_{ikj} + \cancel{\underline{\rho^2}_{kij}} - \cancel{\underline{\rho^2}_{jki}}}$$

$$= \overbrace{i\varphi}^{\underline{V}\varrho^2} \underline{k}_j + \overbrace{j\varphi}^{\underline{V}\varrho^2} \underline{k}_i - \overbrace{k\varphi}^{\underline{V}\varrho^2} \underline{i}_j = 2\varrho \overbrace{i\varphi}^{\underline{V}\varrho} \underline{k}_j + \overbrace{j\varphi}^{\underline{V}\varrho} \underline{k}_i - \overbrace{k\varphi}^{\underline{V}\varrho} \underline{i}_j$$

$$\Rightarrow \underset{i}{\mathfrak{h}} \underset{j}{\mathfrak{h}^{\ell}} - \underset{i}{\mathfrak{h}} \underset{j}{\mathfrak{h}^{\ell}} = \mathfrak{h}^{\ell k} \left(\underset{i}{\mathfrak{h}} \underset{j}{\mathfrak{Q}} \underset{kj}{\mathfrak{h}} + \underset{j}{\mathfrak{h}} \underset{i}{\mathfrak{Q}} \underset{ki}{\mathfrak{h}} - \underset{k}{\mathfrak{h}} \underset{ij}{\mathfrak{Q}} \underset{ij}{\mathfrak{h}} \right) = \underset{i}{\mathfrak{h}} \underset{j}{\mathfrak{Q}} \underset{kj}{\mathfrak{h}^{\ell k}} + \underset{j}{\mathfrak{h}} \underset{i}{\mathfrak{Q}} \underset{ki}{\mathfrak{h}^{\ell k}} - \mathfrak{h}^{\ell k} \underset{k}{\mathfrak{Q}} \underset{ij}{\mathfrak{h}} = \underset{i}{\mathfrak{h}} \underset{j}{\mathfrak{Q}} \underset{\ell}{\delta_j} + \underset{j}{\mathfrak{h}} \underset{i}{\mathfrak{Q}} \underset{\ell}{\delta_i} - \underset{k}{\mathfrak{Q}} \underset{ij}{\mathfrak{h}}$$