$$g^{ik}\left[\Gamma^{s}_{ik,s} - \tfrac{1}{2}(\Gamma^{s}_{is,k} + \Gamma^{s}_{sk,i}) - \Gamma^{a}_{is}\Gamma^{b}_{ak} + \Gamma^{a}_{ik}\Gamma^{b}_{as}\right]$$

$$-g^{ik}{}_{;l} + \tfrac{1}{2}\delta^{i}_{l}\,g^{sk}{}_{;s} + \tfrac{1}{2}\delta^{k}_{l}\,g^{is}{}_{;s} \quad \Big| -\tfrac{1}{2}g^{tk}\Gamma^{s}_{ts}\delta^{i}_{l} + \tfrac{1}{2}g^{it}\Gamma^{s}_{ts}\delta^{k}_{l}$$

$$+g^{tk}\Gamma^{s}_{ts} - g^{tk}\Gamma^{s}_{ts}$$

$$\tfrac{1}{2}\,|\,g^{tk}\Gamma^{s}_{ts}$$

Diese Γ nun Γ^{x} genannt. $\quad \Gamma^{xl}_{ik} + \frac{1}{3}(\delta^{l}_{i}\Gamma^{xs}_{ks} - \delta^{l}_{k}\Gamma^{xs}_{is}) = \Gamma^{l}_{ik}$

$$\Gamma^{xs}_{is} + \tfrac{1}{3}\Gamma^{s}_{is} - \tfrac{4}{3}\Gamma^{s}_{is} = \Gamma^{l}_{il} = 0$$

Setzen $\Gamma^{lx}_{ik} = \Gamma^{l}_{ik} + \frac{1}{3}(\Gamma^{sx}_{is}\delta^{l}_{k} - \Gamma^{sx}_{ks}\delta^{l}_{i})$

$$g^{ik}_{x;jl} = g^{ik}_{;jl} + g^{sk}\Gamma^{i}_{se} + g^{is}\Gamma^{k}_{es} - g^{ik}\Gamma^{s}_{es}$$

$$= g^{ik}_{;jl} + g^{sk}\tfrac{1}{3}(\Gamma^{t}_{st}\delta^{i}_{e} - \Gamma^{t}_{et}\delta^{i}_{s}) + g^{is}\tfrac{1}{3}(\Gamma^{t}_{et}\delta^{k}_{s} - \Gamma^{t}_{st}\delta^{k}_{e}) \quad \Big| -1$$

$$g^{sk}_{x;s} = g^{sk}_{;s} + g^{sk}\tfrac{1}{3}(4\Gamma^{t}_{st} - \Gamma^{t}_{st}) + g^{ps}\tfrac{1}{3}\Gamma^{t}_{pt}\delta^{k}_{s} - \tfrac{1}{3}g^{ks}\Gamma^{t}_{st} \quad \Big| \tfrac{1}{2}\delta^{i}_{e}$$

$$g^{is}_{x;s} = g^{is}_{;s} + g^{is}\tfrac{1}{3}(-4\Gamma^{t}_{st} + \Gamma^{t}_{st}) + g^{sp}\tfrac{1}{3}(-\Gamma^{t}_{pt}\delta^{i}_{s} + \tfrac{1}{3}g^{si}\Gamma^{t}_{st}) \quad \Big| \tfrac{1}{2}\delta^{k}_{e}$$

$$\delta^{i}_{e}\left(-\tfrac{1}{3}g^{sk}\Gamma^{t}_{st} + \tfrac{1}{2}g^{sk}\Gamma^{t}_{st} - \tfrac{1}{6}g^{ks}\Gamma^{t}_{st}\right)$$

$$\delta^{k}_{e}\left(\quad\right)$$

$$+\Gamma^{t}_{et}\left(-\tfrac{1}{3}g^{ik} + \tfrac{1}{3}g^{ik}\right) + \tfrac{1}{6}g^{pk}\Gamma^{t}_{pt}\delta^{i}_{e} - \tfrac{1}{6}g^{ip}\Gamma^{t}_{pt}\delta^{k}_{e}$$

$$\Big|\; \tfrac{1}{3}g^{sk}\Gamma^{t}_{st} + \tfrac{1}{6}g^{ks}\Gamma^{t}_{st} \quad /\delta^{i}_{e}$$

$$-\tfrac{1}{2}g^{sk}\Gamma^{t}_{st}$$

$$-\tfrac{1}{6}(g^{ks} + g^{sk})\delta^{i}_{e}\Gamma^{t}_{st}$$

$$-U^{ik}{}_{l} + \tfrac{1}{2}\delta^{i}_{l}U^{sk}{}_{s} + \tfrac{1}{2}\delta^{k}_{l}U^{is}{}_{s} = -\tfrac{1}{2}g^{tk}\Gamma^{l}_{tl}\delta^{i}_{l} + \tfrac{1}{2}g^{it}\Gamma^{l}_{tl}\delta^{k}_{l}$$

$$-U^{is}{}_{s} + \tfrac{1}{2}U^{si}{}_{s} + 2U^{is}{}_{s} = -\tfrac{1}{2}g^{ti}\Gamma^{s}_{ts} + 2g^{it}\Gamma^{s}_{ts} \quad \Big| 1 \quad -\tfrac{3}{2}U^{si}{}_{s} = \tfrac{7}{2}g^{ti}\Gamma^{s}_{ts} + g^{it}\Gamma^{s}_{ts}$$

$$-U^{sk}{}_{s} + 2U^{sk}{}_{s} + \tfrac{1}{2}U^{ks}{}_{s} = -2g^{tk}\Gamma^{s}_{ts} + \tfrac{1}{2}g^{kt}\Gamma^{s}_{ts} \quad \Big| -2 \quad -\tfrac{3}{2}U^{is}{}_{s} = -g^{tk}\Gamma^{s}_{ts} - \tfrac{7}{2}g^{it}\Gamma^{s}_{ts}$$

$$-U^{ik}{}_{l} = \tfrac{1}{2}\left[-g^{tk}\Gamma^{s}_{ts} - \left(-\tfrac{7}{3}g^{tk}\Gamma^{s}_{ks} - \tfrac{2}{3}g^{kt}\Gamma^{s}_{ts}\right)\right]\delta^{i}_{l} +$$

$$\left(-\tfrac{2}{3}g^{tk}\Gamma^{s}_{ts} + \tfrac{1}{3}g^{kt}\Gamma^{s}_{ts}\right)\delta^{i}_{l} +$$

$$-\left(g^{ik}_{;jl} + U^{ik}{}_{l}\right) = \tfrac{1}{3}g^{sk}\Gamma^{t}_{st}\delta^{i}_{l} - \tfrac{2}{3}g^{tk}\Gamma^{s}_{ts}\delta^{i}_{l} + \tfrac{1}{3}g^{kt}\Gamma^{s}_{ts}\delta^{i}_{l}$$

$$\tfrac{1}{3}\left(g^{kt}\Gamma^{s}_{ts} - g^{tk}\Gamma^{s}_{ts}\right)\delta^{i}_{l}$$

$$g^{ik} \Big| \; \Gamma^{s}_{ik,s} - \Gamma^{s}_{is,k} - \Gamma^{s}_{it}\Gamma^{t}_{sk} + \Gamma^{s}_{ik}\Gamma^{t}_{st}$$

$$g^{pq}\Gamma^{i}_{pq}\delta_l^{k} \,|\, \delta\Gamma^{l}_{ik}$$

$$+ \delta\Gamma^{t}_{st}\Gamma^{s}_{ik} g^{ik}$$

$$-g^{ik}{}_{,l} + g^{is}{}_{,s}\delta_l^{k} + g^{st}\Gamma^{i}_{st}\delta_l^{k} \;\Big|\; + g^{it}\Gamma^{s}_{st} - g^{ik}\Gamma^{s}_{ts}$$

$$\delta_l^{k} \qquad -g^{it}\Gamma_t$$

$$\delta_l^{k}\left(g^{is}{}_{,s} + g^{it}\Gamma_t\right)$$

$$(g^{is}{}_{,s} + g^{st}\Gamma^{i}_{st})\,\delta_l^{k} + g^{it}\Gamma^{s}_{st} - g^{is}\Gamma^{s}_{ts}$$

$$-g^{ik}{}_{,l} + \delta_l^{k}(g^{is}{}_{,s} + g^{it}\Gamma_t) = 0$$

$$3g^{is}{}_{,s} + 4g^{it}\Gamma_t = 0 \qquad g^{is}{}_{,s} = -\frac{4}{3}g^{it}\Gamma_t$$

$$\boxed{+g^{ik}{}_{,l} + \frac{1}{3}\delta_l^{k} g^{it}\Gamma_t = 0}$$

$$\boxed{\Gamma^{l}_{ik} = \overset{\times}{\Gamma}{}^{l}_{ik} + \alpha\,\delta_i^{l}\Gamma_k + \beta\,\delta_k^{l}\Gamma_i}$$

$$\Gamma^{l}_{\underset{\vee}{ik}} = \overset{\times}{\Gamma}{}^{l}_{ik} + \tfrac{1}{2}(\alpha-\beta)\delta_i^{l}\Gamma_k + \tfrac{1}{2}(\beta-\alpha)\delta_k^{l}\Gamma_i$$

Vorl. $\overset{\times}{\Gamma}{}^{\alpha}_{i\alpha} = 0$

$$\Gamma^{s}_{is} = \tfrac{1}{2}(\alpha-\beta)\Gamma_i + 2(\beta-\alpha)\Gamma_i$$

$$= -\tfrac{3}{2}(\alpha-\beta)\Gamma_i \qquad \boxed{\alpha-\beta = -\tfrac{2}{3}}$$

$$\Gamma^{l}_{ik} = \overset{\times}{\Gamma}{}^{l}_{ik} + \tfrac{1}{2}(\alpha+\beta)(\delta_i^{l}\Gamma_k + \delta_k^{l}\Gamma_i)$$

$$g^{ik}{}_{,l} + g^{sk}\Gamma^{i}_{sl} + g^{is}\Gamma^{k}_{ls} - g^{ik}\Gamma^{s}_{ls}$$

$$\overset{\times}{\Gamma}{}^{i}_{sl} - \tfrac{2}{3}\delta_s^{i}\Gamma_l \qquad \overset{\times}{\Gamma}{}^{k}_{ls} - \tfrac{2}{3}\delta_l^{k}\Gamma_s \qquad -g^{ik}(\alpha+4\beta$$

Im besondere Fall
$\beta = \frac{1}{3} \quad \alpha = -\frac{1}{3}$

$$\Gamma^{l}_{ik} = \overset{\times}{\Gamma}{}^{l}_{ik} + \tfrac{1}{3}(\Gamma_i\delta_k^{l} - \Gamma_k\delta_i^{l})$$

$$g^{ik}{}_{\underset{\times}{,l}} - \frac{2}{3}g^{ik}\Gamma_l - \frac{2}{3}g^{is}\Gamma_s\delta_l^{k} \;\Big|\; + \frac{1}{3}\delta_l^{k} g^{it}\Gamma_t$$

$$-\tfrac{5}{2}(\alpha+\beta)g^{ik}\Gamma_l$$

hebt sich nicht weg.

$$g^{ik}{}_{\underset{\times}{,l}} + g^{sk}(\alpha\,\delta_s^{i}\Gamma_l + \beta\,\delta_l^{i}\Gamma_s) + g^{is}(\alpha\,\delta_l^{k}\Gamma_s + \beta\,\delta_s^{k}\Gamma_l) + \tfrac{1}{3}\delta_l^{k} g^{is}\Gamma_s$$

$$\alpha g^{ik}\Gamma_l + \beta g^{ik}\Gamma_l + \beta\,\delta_l^{i} g^{sk}\Gamma_s + \alpha\,\delta_l^{k} g^{is}\Gamma_s \qquad -\tfrac{5}{2}(\alpha+\beta)g^{ik}\Gamma_l$$

$$\alpha+\beta = 0 \qquad \alpha = -\tfrac{1}{3}$$
$$\alpha-\beta = -\tfrac{2}{3} \qquad \beta = \tfrac{1}{3}$$

bleiben übrig.

$$(\alpha+\beta) - \tfrac{5}{2}(\alpha+\beta)$$

A. Einstein.