Ex.

INVERSE SUPER-WEYL TRANSFORMATIONS

Ex: TO OBTAIN →

$$\tilde E^a = e^{W+\bar W} E^a \qquad\qquad E^a = e^{-W-\bar W}\tilde E^a$$

$$\tilde E^\alpha = e^W \left(E^\alpha - \frac{i}{4} E^a \tilde\sigma_a^{\dot\alpha\alpha} \bar\nabla_{\dot\alpha} W\right) \qquad\qquad E^\alpha = e^{-W}\left(\tilde E^\alpha + \frac{i}{4}\tilde E^a \tilde\sigma_a^{\dot\alpha\alpha}\tilde{\bar\nabla}_{\dot\alpha} W\right)$$

$$\tilde{\bar E}^{\dot\alpha} = e^{\bar W}\left(\bar E^{\dot\alpha} - \frac{i}{4} E^a \tilde\sigma_a^{\dot\alpha\alpha}\nabla_\alpha \bar W\right) \qquad\qquad \bar E^{\dot\alpha} = e^{-\bar W}\left(\tilde{\bar E}^{\dot\alpha} + \frac{i}{4}\tilde E^a \tilde\sigma_a^{\dot\alpha\alpha}\tilde\nabla_\alpha \bar W\right)$$

$$\tilde W^{\alpha\beta} = W^{\alpha\beta} + 2E^{(\alpha}\mathcal D^{\beta)} W - \frac{i}{2} E^a \tilde\sigma_a^{\dot\beta(\beta}\bar{\mathcal D}_{\dot\beta}\nabla^{\alpha)} W =$$
$$= W^{\alpha\beta} + 2\tilde E^{(\alpha}\tilde{\mathcal D}^{\beta)}W - \frac{i}{2}\tilde E^a \tilde\sigma_a^{\dot\beta(\beta}\tilde{\bar{\mathcal D}}_{\dot\beta}\nabla^{\alpha)}W$$

$$\tilde W^{\dot\alpha\dot\beta} = W^{\dot\alpha\dot\beta} \overset{+}{-} 2\bar E^{(\dot\alpha}\bar{\mathcal D}^{\dot\beta)}\bar W \overset{-}{+} \frac{i}{2} E^a \tilde\sigma_a^{(\dot\alpha|\beta}\mathcal D_\beta \bar\nabla^{|\dot\beta)}\bar W =$$
$$= W^{\dot\alpha\dot\beta} \overset{+}{-} 2\tilde{\bar E}^{(\dot\alpha}\tilde{\bar{\mathcal D}}^{\dot\beta)}\bar W \overset{-}{+} \frac{i}{2}\tilde E^a\tilde\sigma_a^{(\dot\alpha|\beta}\mathcal D_\beta\bar\nabla^{|\dot\beta)}\bar W$$

$\Leftarrow \overset{-}{\ }\frac{1}{4} W^{ab}\tilde\sigma_{ab}^{\dot\alpha\dot\beta} = \overset{+}{-}(W^{\alpha\beta})^*$

$$\tilde W^{ab} = W^{ab} + \frac12 \Delta W^{\alpha\beta}\sigma^{ab}_{\alpha\beta} \overset{-}{+} \frac12 \Delta W^{\dot\alpha\dot\beta}\tilde\sigma^{ab}_{\dot\alpha\dot\beta} =$$
$$= W^{ab} - E^\alpha \sigma^{ab}{}_\alpha{}^\beta \mathcal D_\beta W + \bar E^{\dot\alpha}\bar{\mathcal D}_{\dot\beta}\bar W (\tilde\sigma^{ab})^{\dot\beta}{}_{\dot\alpha} - \frac{i}{2} E^{[a}\tilde\sigma^{b]\dot\alpha\alpha}(\bar{\mathcal D}_{\dot\alpha}\mathcal D_\alpha W + \mathcal D_\alpha\bar{\mathcal D}_{\dot\alpha}\bar W) +$$
$$+ \frac12 E^c \varepsilon^{ab}{}_{cd}\tilde\sigma^{d\dot\alpha\alpha}(\bar{\mathcal D}_{\dot\alpha}\mathcal D_\alpha W - \mathcal D_\alpha\bar{\mathcal D}_{\dot\alpha}\bar W)$$
$$= (E\to\tilde E,\ \mathcal D\to\tilde{\mathcal D})$$

⇒ Variation of the super-Weyl-transformed supervielbein and connection:

(FOR SHORTNESS $\tilde E^A \xrightarrow{\text{IS DENOTED}} E^A$)

$$\delta_W E^a = E^a(\Lambda(\delta)+\bar\Lambda(\delta)) \qquad\qquad W' = W + \Lambda(\delta)$$
$$\delta_W E^\alpha = E^\alpha\Lambda(\delta) - \frac{i}{4}E^a\tilde\sigma_a^{\dot\alpha\alpha}\bar\nabla_{\dot\alpha}\Lambda(\delta)$$
$$\delta_W\bar E^{\dot\alpha} = \bar E^{\dot\alpha}\bar\Lambda(\delta) - \frac{i}{4}E^a\tilde\sigma_a^{\dot\alpha\alpha}\nabla_\alpha\bar\Lambda(\delta)$$

$$\delta_W W^{\alpha\beta} = 2E^{(\alpha}\nabla^{\beta)}\Lambda(\delta) - \frac{i}{2}E^a\tilde\sigma_a^{\dot\beta(\beta}\bar{\mathcal D}_{\dot\beta}\nabla^{\alpha)}\Lambda(\delta)$$
$$\delta_W W^{\dot\alpha\dot\beta} = -2\bar E^{(\dot\alpha}\bar\nabla^{\dot\beta)}\bar\Lambda(\delta) - \frac{i}{2}E^a\tilde\sigma_a^{(\dot\beta|\beta}\mathcal D_\beta\bar\nabla^{\dot\beta)}\bar\Lambda(\delta)$$
$$\delta_W W^{ab} = -E^\alpha\sigma^{ab}{}_\alpha{}^\beta\nabla_\beta\Lambda(\delta) + \bar E^{\dot\alpha}\tilde\sigma^{ab\dot\beta}{}_{\dot\alpha}\bar\nabla_{\dot\beta}\Lambda(\delta) +$$
$$+ E^c\left(\frac14\varepsilon^{ab}{}_{cd}\tilde\sigma^{d\dot\alpha\alpha}(\bar{\mathcal D}_{\dot\alpha}\mathcal D_\alpha\Lambda(\delta) - \mathcal D_\alpha\bar{\mathcal D}_{\dot\alpha}\bar\Lambda(\delta)) - \frac{i}{2}\delta_c^{[a}\tilde\sigma^{b]\dot\alpha\alpha}(\bar{\mathcal D}_{\dot\alpha}\mathcal D_\alpha\Lambda(\delta) + \mathcal D_\alpha\bar{\mathcal D}_{\dot\alpha}\bar\Lambda(\delta))\right)$$

Super-WEYL TRANSFORMATIONS OF TORSION (AND CURVATURE) 2-FORMS AND MAIN SUPERFIELDS,

CONSTRAINTS OF SUGRA WITHOUT 3rd CLASS CONSTRAINTS AND THEIR CONSEQUENCES.

Ex: TO CALCULATE:

$$\boxed{\tilde{T}^a = -2i\,\hat{E}^\alpha\wedge\hat{\bar{E}}^{\dot\alpha} + \hat{E}^b\wedge\hat{E}^\alpha\,\tfrac12(\sigma_b\tilde\sigma^a)_\alpha{}^\beta\,\hat{\nabla}_\beta(2W+\bar W) + \tilde{E}^b\wedge\hat{\bar E}^{\dot\alpha}\,\tfrac12(\tilde\sigma^a\sigma_b)^{\dot\beta}{}_{\dot\alpha}\,\hat{\bar\nabla}_{\dot\beta}(2\bar W+W) + \tfrac12\hat{E}^c\wedge\hat{E}^b\,T_{bc}{}^a}$$

$$\tilde{T}_{bc}{}^a = \tfrac18\,\epsilon^a{}_{bcd}\left(G^d e^{W+\bar W} + 4\tilde\sigma^{d\dot\alpha\alpha}\left(\bar{\mathcal D}_{\dot\alpha}\mathcal{D}_\alpha W - \mathcal{D}_\alpha\bar{\mathcal D}_{\dot\alpha}\bar W\right)\right) + $$
$$+\ \delta_{[b}{}^a\,\hat\sigma_{c]}{}^{\dot\alpha\alpha}\left(\tfrac12\bar{\mathcal D}_{\dot\alpha}\mathcal{D}_\alpha W + \mathcal{D}_\alpha\bar{\mathcal D}_{\dot\alpha}\bar W - \mathcal{D}_{c]}(W+\bar W)\right) +$$
$$+ \sim \overleftrightarrow{\nabla}\overset{(-)}{W}\,\overleftrightarrow{\nabla}\overset{(-)}{W}$$

Ex: TO CALCULATE UP TO FERMION BILINEARS

$$\boxed{\tilde{T}^\alpha = \tfrac{i}{8}\,\tilde{E}^b\wedge\hat{\bar E}^{\dot\beta}(\sigma_b\hat\sigma_a)_{\dot\beta}{}^{\dot\alpha}\,\tilde{\mathcal{G}}^a - \tfrac{i}{8}\,\tilde{E}^b\wedge\hat{\bar E}^{\dot\beta}\,\sigma_{b\dot\beta}{}^\alpha\,\hat{\tilde{R}} + \tfrac12\tilde{E}^c\wedge\hat{E}^b\,\tilde{T}_{bc}{}^\alpha}$$

AN ADVANTAGE OF OUR CHOICE OF CONSTRAINTS:

THE FORM OF FERMIONIC TORSION IS INVARIANT UNDER SUPER-WEYL TRANSF-S

BUT TRANSFORMED G_a IS GENERICALLY NOT REAL

$$\tilde{\mathcal{G}}_a = G_a e^{-W-\bar W} + \hat\sigma_a^{\dot\alpha\alpha}\hat{\bar{\mathcal{D}}}_{\dot\alpha}\hat\nabla_\alpha W + 4i\hat\nabla_a W + \hat\nabla W\sigma_a\hat{\bar\nabla}W$$
$$= e^{-W-\bar W}\left(G_a + \bar{\mathcal D}_{\dot\alpha}\nabla_\alpha W\,\hat\sigma_a^{\dot\alpha\alpha} + 4i\nabla_a W\right) \neq (\mathcal{G}_a)^*$$

GENERICALLY

$$\hat{\tilde{R}} = Re^{-2\bar W} - \hat{\bar{\mathcal D}}\hat{\bar\nabla}W - \hat{\bar\nabla}_{\dot\alpha}W\cdot\hat{\bar\nabla}^{\dot\alpha}W$$
$$= e^{-2\bar W}\left(R - \bar{\mathcal D}\bar\nabla W - \bar\nabla_{\dot\alpha}W\,\bar\nabla^{\dot\alpha}W - 2\bar\nabla_{\dot\alpha}\bar W\cdot\bar\nabla^{\dot\alpha}W\right)$$

$$\boxed{\tilde{R}^{\alpha\beta} = -\tfrac12\hat{E}^\alpha\wedge\hat{E}^\beta\,\tilde{\bar{R}} + \tilde{E}^b\wedge\hat{E}^\gamma\,\tilde{R}_{\gamma b}{}^{\alpha\beta} + \tilde{E}^b\wedge\hat{\bar E}^{\dot\gamma}\,\tilde{R}_{\dot\gamma b}{}^{\alpha\beta} + \tfrac12\tilde{E}^d\wedge\hat{E}^c\,\tilde{R}_{cd}{}^{\alpha\beta}}$$

(ALSO FORM INV. IN THIS SENCE)

$$\tilde{\bar{R}} = e^{-2W}\left(\bar R + 2\mathcal{D}\nabla W - 4\nabla^\gamma W\,\nabla_\gamma W\right) =$$
$$= -(\mathcal{D}\mathcal{D} - \bar R)e^{-2W} \neq \hat{\tilde{\bar R}}$$

GENERICALLY

$$\bar{\mathcal D}_{\dot\alpha}\hat{\bar R} = 0 \Rightarrow \boxed{\hat{\bar{\mathcal D}}_{\dot\alpha}\hat{\bar R} = 0}$$

Super-Weyl transformation from min SG: Torsion and curvature without 3d class constraints

|| Solution ~~of 1st~~ BIs with and 2nd class
SUGRA CONSTRAINTS
(no 3rd class constraints imposed)
FROM SUPER-WEYL TRANSF-s

30/07/2014 – 06/08/2014

$$\hat{E}^a = e^{W+\bar{W}} E^a \,, \qquad E^a = e^{-W-\bar{W}} \hat{E}^a$$

$$\hat{E}^\alpha = e^{W}\left(E^\alpha - \tfrac{i}{4} E^a \hat{\sigma}_a^{\dot{\alpha}\alpha} \bar{D}_{\dot{\alpha}} W\right), \qquad E^\alpha = e^{-W}\left(\hat{E}^\alpha + \tfrac{i}{4} \hat{E}^a \hat{\sigma}_a^{\dot{\alpha}\alpha} \hat{\bar{\nabla}}_{\dot{\alpha}} W\right)$$

$$\hat{\bar{E}}^{\dot{\alpha}} = e^{\bar{W}}\left(\bar{E}^{\dot{\alpha}} - \tfrac{i}{4} E^a \hat{\sigma}_a^{\dot{\alpha}\alpha} D_\alpha \bar{W}\right), \qquad \bar{E}^{\dot{\alpha}} = e^{-\bar{W}}\left(\hat{\bar{E}}^{\dot{\alpha}} + \tfrac{i}{4} \hat{E}^a \hat{\sigma}_a^{\dot{\alpha}\alpha} \nabla_\alpha W\right)$$

$$\left.\begin{aligned} &\hat{w}^{\alpha\beta} = w^{\alpha\beta} + 2\, E^{(\alpha} \mathcal{D}^{\beta)} W - \tfrac{i}{2} E^a \hat{\sigma}_a{}^{\dot{\beta}(\beta} \bar{\mathcal{D}}_{\dot{\beta}} \mathcal{D}^{\alpha)} W \\ &\hat{\bar{w}}^{\dot{\alpha}\dot{\beta}} = -(\hat{w}^{\alpha\beta})^* = w^{\dot{\alpha}\dot{\beta}} - 2\, \bar{E}^{(\dot{\alpha}} \bar{\mathcal{D}}^{\dot{\beta})} \bar{W} + \tfrac{i}{2} E^a \hat{\sigma}_a{}^{(\dot{\beta}|\beta} \mathcal{D}_\beta \bar{\mathcal{D}}^{|\dot{\alpha})} \bar{W} \\ &\Leftarrow -\tfrac{1}{4} w^{ab} (\hat{\sigma}_{ab})^{\dot{\alpha}\dot{\beta}} \end{aligned}\right\} \Rightarrow$$

$$\boxed{\hat{w}^{ab} = w^{ab} + \tfrac{1}{2} \Delta w^{\alpha\beta} \sigma^{ab}_{\alpha\beta} - \tfrac{1}{2} \Delta w^{\dot{\alpha}\dot{\beta}} \hat{\sigma}^{ab}_{\dot{\alpha}\dot{\beta}} = w^{ab} - E^\alpha \sigma^{ab}{}_\alpha{}^\beta D_\beta W + \bar{E}^{\dot{\alpha}} \bar{\mathcal{D}}_{\dot{\beta}} \bar{W} (\hat{\sigma}^{ab})^{\dot{\beta}}{}_{\dot{\alpha}} + }$$
$$+ E^c \cdot \left(\tfrac{i}{4} \varepsilon^{ab}{}_{cd} \hat{\sigma}^{d\dot{\alpha}\alpha} (\bar{\mathcal{D}}_{\dot{\alpha}} \mathcal{D}_\alpha W - \mathcal{D}_\alpha \bar{\mathcal{D}}_{\dot{\alpha}} W) - \tfrac{i}{2} \delta_c^{[a} \hat{\sigma}^{b]\dot{\alpha}\alpha} (\bar{\mathcal{D}}_{\dot{\alpha}} \mathcal{D}_\alpha W + \mathcal{D}_\alpha \bar{\mathcal{D}}_{\dot{\alpha}} \bar{W}\right)$$

$$\Leftarrow E^c \Delta \hat{w}_c{}^{ab}$$

$$\hat{T}^a = -2i \hat{E}^\alpha \wedge \hat{\bar{E}}^{\dot{\alpha}} \sigma^a_{\alpha\dot{\alpha}} + \hat{E}^b \wedge \hat{E}^\alpha \tfrac{1}{2} (\sigma_b \hat{\sigma}^a)_\alpha{}^\beta \hat{\nabla}_\beta (2W + \bar{W}) + \hat{E}^b \wedge \hat{\bar{E}}^{\dot{\alpha}} \tfrac{1}{2} (\hat{\sigma}^a \sigma_b)^{\dot{\beta}}{}_{\dot{\alpha}} \hat{\bar{\nabla}}_{\dot{\beta}} (2\bar{W} + W) + \tfrac{1}{2} \hat{E}^c \wedge \hat{E}^b \hat{T}_{bc}{}^a$$

$$\hat{T}_{bc}{}^a = \tfrac{1}{8} \epsilon^a{}_{bcd} \left(G^d e^{W+\bar{W}} + 4 \hat{\sigma}^{d\dot{\alpha}\alpha} (\bar{\mathcal{D}}_{\dot{\alpha}} \mathcal{D}_\alpha W - \mathcal{D}_\alpha \bar{\mathcal{D}}_{\dot{\alpha}} \bar{W})\right) +$$
$$+ \delta_{[b}^a \left(\hat{\sigma}_{c]}^{\dot{\alpha}\alpha} \cdot \tfrac{1}{2} (\bar{\mathcal{D}}_{\dot{\alpha}} \mathcal{D}_\alpha W + \mathcal{D}_\alpha \bar{\mathcal{D}}_{\dot{\alpha}} \bar{W}) - 2 D_{c]} (W + \bar{W})\right) + \sim \nabla \overset{(-)}{W} \otimes \bar{\nabla} \hat{W}$$

complex.

$$\boxed{\hat{T}^\alpha = \tfrac{i}{8} \hat{E}^b \wedge \hat{E}^\beta (\sigma_b \hat{\sigma}_a)_\beta{}^\alpha \hat{\mathcal{G}}^a - \tfrac{i}{8} \hat{E}^b \wedge \hat{\bar{E}}^{\dot{\beta}} \sigma_{b\beta\dot{\beta}}{}^\alpha \hat{\mathcal{R}} + \tfrac{1}{2} \hat{E}^c \wedge \hat{E}^b \hat{T}_{bc}{}^\alpha}$$

BIG ADVANTAGE OF OUR CHOICE OF TORSION CONSTRAINTS IS THAT THE FORM OF T^α is super-Weyl inv!

$$\boxed{\hat{\mathcal{G}}_a = G_a e^{-W-\bar{W}} + \hat{\sigma}_a^{\dot{\alpha}\alpha} \hat{\bar{\mathcal{D}}}_{\dot{\alpha}} \hat{\nabla}_\alpha W + 4i \hat{\nabla}_a W + \hat{\nabla} \bar{W} \sigma_a \hat{\bar{\nabla}} W} \neq \overline{\hat{\mathcal{G}}_a} \quad (!)$$

$$\boxed{\hat{\mathcal{R}} = R e^{-2\bar{W}} - \hat{\bar{\mathcal{D}}} \hat{\bar{\nabla}} W - \hat{\bar{\nabla}}_{\dot{\alpha}} W \cdot \hat{\bar{\nabla}}^{\dot{\alpha}} W} \neq \tilde{R}\,!$$

$$\hat{\bar{\mathcal{R}}} = \bar{R} e^{-2W} - \hat{\mathcal{D}} \hat{\nabla} \bar{W} - \hat{\nabla}^\alpha \bar{W} \cdot \hat{\nabla}_\alpha \bar{W} \neq \tilde{\bar{R}}$$

$$\tilde{\bar{R}} = e^{-2W} (\bar{R} + 2\mathcal{D}\nabla W - 4\nabla^\gamma W \cdot \nabla_\gamma W) = -(\mathcal{D}\mathcal{D} - \bar{R}) e^{-W} \neq \hat{\bar{\mathcal{R}}} \;; \qquad \tilde{\mathcal{D}}_\alpha \tilde{\bar{R}} = 0 \Leftarrow \mathcal{D}_\alpha \bar{R} = 0$$

$$\boxed{\tilde{R}^{\alpha\beta} = -\tfrac{1}{2} \tilde{E}^\alpha \wedge \hat{E}^\beta \tilde{\bar{R}} + \hat{E}^b \wedge \hat{E}^\gamma R_{\gamma b}{}^{\alpha\beta} + \hat{E}^b \wedge \hat{\bar{E}}^{\dot{\gamma}} R_{\dot{\gamma} b}{}^{\alpha\beta} + \tfrac{1}{2} \hat{E}^d \wedge \hat{E}^c R_{cd}{}^{\alpha\beta}}$$

SUPER-WEYL TRANSF-S FROM MIN. SG. , June-July 2014

$\tilde{E}^a = e^{W+\bar{W}} E^a$

$\tilde{E}^\alpha = e^W (E^\alpha - \frac{i}{4} E^a \tilde{\sigma}_a^{\dot\alpha\alpha} \bar{D}_{\dot\alpha} W)$

$\tilde{E}^{\dot\alpha} = e^{\bar{W}} (E^{\dot\alpha} - \frac{i}{4} E^a \tilde{\sigma}_a^{\dot\alpha\alpha} D_\alpha \bar{W})$

$\tilde{\nabla}_a = e^{-W-\bar{W}} \nabla_a + \frac{i}{4} \tilde{\sigma}_a^{\dot\alpha\alpha} (\bar{\nabla}_{\dot\alpha} W \cdot \nabla_\alpha + \nabla_\alpha \bar{W} \cdot \bar{\nabla}_{\dot\alpha})$

$\tilde{\nabla}_\alpha = e^{-W} \nabla_\alpha$

$\tilde{\bar{\nabla}}_{\dot\alpha} = e^{-\bar{W}} \bar{\nabla}_{\dot\alpha}$

$\Delta w^{\alpha\beta} = \tilde{w}^{\alpha\beta} - w^{\alpha\beta} = 2 E^{(\alpha} \mathcal{D}^{\beta)} W - \frac{i}{2} E^a \tilde{\sigma}_a^{\dot\beta(\beta} \bar{\mathcal{D}}_{\dot\beta} \mathcal{D}^{\alpha)} W$,

$\Delta w^{\dot\alpha\dot\beta} = \tilde{w}^{\dot\alpha\dot\beta} - w^{\dot\alpha\dot\beta} = 2 \bar{E}^{(\dot\alpha} \bar{\mathcal{D}}^{\dot\beta)} \bar{W} - \frac{i}{2} E^a \tilde{\sigma}_a^{(\dot\alpha|\beta} \mathcal{D}_\beta \bar{\mathcal{D}}^{\dot\beta)} \bar{W}$,

$\forall U$

$$\boxed{(\mathcal{D}^\alpha \mathcal{D}_\alpha - \bar{R}) U = \hat{\Delta}^\alpha \hat{\Delta}_\alpha (F^2 U)}$$

$$\boxed{\begin{aligned}\tilde{\bar{R}} &= e^{-2W} \bar{R} - \mathcal{D}\mathcal{D} e^{-2W} = -(\mathcal{D}\mathcal{D} - \bar{R}) e^{-2W} = \\ &= e^{-2W} (\bar{R} + 2\mathcal{D}\mathcal{D} W - 4 \mathcal{D}^\alpha W \cdot \mathcal{D}_\alpha W)\end{aligned}}$$

$\hat{R}_{\alpha\beta}{}^{\gamma\delta} = 0$, $\hat{T}_{\beta\gamma}{}^\alpha = 0$

$\bar{R} = -F^2 (\hat{\Delta}^\alpha \hat{\Delta}_\alpha \ln F^2 + \hat{\Delta}^\alpha \ln F^2 \cdot \hat{\Delta}_\alpha \ln F^2)$

$\tilde{T}_{\alpha b}{}^a = \frac{i}{4} (\sigma_b \tilde{\sigma}^a)_\alpha{}^\beta \tilde{T}_\beta$;

$$\boxed{\hat{T}_\alpha := \hat{T}_{\alpha b}{}^b = 2 \hat{\nabla}_\alpha (2W + \bar{W})}$$

$\boxed{\mathcal{D}_\alpha T_{\beta\gamma} = 0}$!

$\bar{R} - \rho \mathcal{D}^\alpha T_\alpha - \rho^2 T^\alpha T_\alpha = -\frac{F^2}{\Upsilon} \hat{\Delta}^\alpha \hat{\Delta}_\alpha \Upsilon$;

$\bar{\Upsilon} = F^2 (\hat{e} F^4 \bar{F}^2)^{-\bar{\rho}}$

$\Upsilon = \bar{F}^2 (\hat{e} F^2 \bar{F}^4)^{-\rho}$

MIN SG

$T_\alpha = 0$

$\Rightarrow (\hat{e} F^4 \bar{F}^2 = \bar{\varphi}^{-3})$

$\Delta_\alpha \bar{\varphi} = 0$

$\delta_W T_\alpha = -W T_\alpha + 2 \nabla_\alpha (2W + \bar{W})$

$2W + \bar{W} = \bar{\mathcal{K}}$

$\nabla_\alpha \bar{\mathcal{K}} = 0$

$\delta_W (\bar{R} - \rho \mathcal{D}^\alpha T_\alpha - \rho^2 T^\alpha T_\alpha)\big|_{\bar{R} - \rho \mathcal{D}T - \rho^2 TT = 0} = 0 \iff \boxed{(\mathcal{D}^\alpha - 2\rho T^\alpha) \mathcal{D}_\alpha \bar{K} = 0}$

$$\boxed{+\bar{K} := -(1 - 2\rho) W + \rho \bar{W}} = (2\rho - 1) W + \rho \bar{W}$$

$n = 0, \rho = 1$ $\quad \bar{K} = W + \bar{W} = K$ $\quad \boxed{(\mathcal{D}^\alpha - 2T^\alpha) \mathcal{D}_\alpha K = 0 = (\bar{\mathcal{D}}_{\dot\alpha} - 2\bar{T}_{\dot\alpha}) \bar{\mathcal{D}}^{\dot\alpha} K}$