Introduction to supergravity 2015: Exercise 9.

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Our conventions can be found in [1], and we work with the Lagrangian

$$\mathcal{L} = \int d^4\theta\, \bar{\Phi} \mathrm{e}^V \Phi + \left\{ \frac{1}{4g^2} \int d^2\theta\, W^\alpha(V) W_\alpha(V) + c.c. \right\} + 2\xi \int d^4\theta\, V \tag{1}$$

where

$$W_\alpha(V) = -\frac{1}{4} \bar{D}^2 D_\alpha V \tag{2}$$

and g is the dimensionless gauge coupling and ξ is a constant of dimension $[\xi] = 2$. When we turn to WZ gauge, the exponential becomes

$$\mathrm{e}^V|_{WZ} = 1 + V + \frac{1}{2} V^2. \tag{3}$$

1. Write the component form of (1) in the WZ gauge. Write both the fermionic and the bosonic sector.
2. Integrate out the auxiliary fields, and write down the full model.
3. What happens for $\xi > 0$? What happens for $\xi = 0$? What happens for $\xi < 0$?

References

[1] J. Wess and J. Bagger, "Supersymmetry and supergravity," Princeton, USA: Univ. Pr. (1992).