

Levi for \mathfrak{g}^ϵ

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$$\begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix} \begin{pmatrix} 1 & \\ & -1 \end{pmatrix} \begin{pmatrix} 0 & \epsilon \\ 0 & 0 \end{pmatrix} \begin{pmatrix} f & \\ 0 & 0 \end{pmatrix}$$

$$\mathfrak{sl}_2: \langle e, f, h \rangle \text{ with } [h, e] = 2e \quad [h, f] = -2f \quad [e, f] = h$$

$$\mathfrak{g}^\epsilon := \langle h, e, f \rangle / \begin{matrix} [f, h] = f \\ [e, h] = -e \\ [e, f] = h - 2\epsilon e \end{matrix} \quad \text{w/ } v_{12} = (h_1 - \epsilon e_1)h_2 + e_1 f_2$$

with $g := h - 2\epsilon e$ this becomes

$$\langle h, e, g, f \rangle / \begin{matrix} [f, g] = -2\epsilon f \\ [e, g] = 2\epsilon e \\ [e, f] = g \end{matrix} \quad \text{w/ } v_{12} =$$

→ scale e, g to get \mathfrak{sl}_2 .