

$$\mathfrak{U} | \mathbb{O}^{\mathbb{I}} \triangleleft_{\mathfrak{w}}^2 \check{C} = \mathbb{O}^{\mathbb{I}} \times \mathbb{O}^{\mathbb{I}} \triangleleft_{\mathfrak{w}}^2 \check{C} \ni \mathfrak{r}$$

$$\overline{\mathfrak{r}\gamma} = \mathfrak{r}_w \int_{\mu_w^\nu}^{\mathbb{O}^{\mathbb{I}}} w\gamma$$

$$\begin{array}{l} \begin{array}{l} \overline{()}_J \\ \overline{()}_\tau \\ \overline{()}_\sigma \end{array} = \begin{array}{l} \overline{()}_J^* \\ \overline{()}_\tau^* \\ \overline{()}_\sigma^* \end{array} \downarrow \begin{array}{l} \text{allg} \\ \text{Toep} \\ \text{Weyl} \end{array} \\ \mathbb{O}^{\mathbb{I}} \triangleleft_{\mathfrak{w}}^2 \check{C} \\ \mathbb{O}^{\mathbb{I}} \triangleleft_{\mathfrak{w}}^2 \check{C} \end{array}$$

$$\int_{\mu_\zeta^0}^{\mathbb{O}^{\mathbb{I}}} \zeta^J \mathfrak{r}_J = \mathfrak{J} \mathfrak{r}_J = \overline{\mathfrak{J}} \mathfrak{r}_J = \text{tr} \overline{\mathfrak{J}}^* \mathfrak{r}$$

to be modified

$$\text{gen field / } \overline{\zeta} = \overline{\zeta : \zeta} \in \mathfrak{U} | \mathbb{O}^{\mathbb{I}} \triangleleft_{\mathfrak{w}}^2 \check{C} \text{ self-adj}$$

$$\overline{\mathfrak{J}} = \overline{\zeta} \int_{\mu_\zeta^0}^{\mathbb{O}^{\mathbb{I}}} \zeta^J \in \mathfrak{U} | \mathbb{O}^{\mathbb{I}} \triangleleft_{\mathfrak{w}}^2 \check{C}$$

$$\overline{\mathfrak{J}}^* = \overline{\mathfrak{J}}$$

$$\mathfrak{U} | \mathbb{O}^{\mathbb{I}} \ni \mathfrak{r} \xRightarrow{\text{covariance}} \begin{cases} \mathfrak{r}^\nu \overline{\zeta} \mathfrak{r}^{-\nu} = \overline{\zeta} \mathfrak{r}^{-1} \\ \mathfrak{r} \mathfrak{r}^\nu \overline{\mathfrak{r}} \mathfrak{r}^{-\nu} = \overline{\mathfrak{r} \mathfrak{r} \mathfrak{r}} \end{cases}$$

$$\overline{\zeta \circ_{\mathbb{C}}^{-\nu} w} = \overline{\zeta \circ_{\mathbb{C}}^{-\nu} z}$$

$$\text{LHS} = \overline{\circ_{\mathbb{C}}^{-\nu} z \times \zeta \circ_{\mathbb{C}}^{-\nu} w} = \overline{\zeta \circ_{\mathbb{C}}^{-\nu} w} \times \circ_{\mathbb{C}}^{-\nu} z \stackrel{\text{s.a.}}{=} \circ_{\mathbb{C}}^{-\nu} w \times \overline{\zeta \circ_{\mathbb{C}}^{-\nu} z} = \text{RHS}$$

$$\overline{\zeta : \zeta}^{\tau} = \overline{\zeta}^{\tau} \overline{\zeta}^{\tau*} \text{ Toep}$$

$$\mathbb{U} | \circ_{\mathbb{I}} \ni \mathcal{V} \stackrel{\text{covariance}}{\Rightarrow} \mathcal{V}^{\nu} \overline{\zeta}^{\tau} \mathcal{V}^{-\nu} = \overline{\zeta^{\tau} \mathcal{V}^{-1}}$$

$$\mathcal{T}_{\mathbb{J}} = \int_{\mu_{\zeta}^0}^{\circ_{\mathbb{I}}} \circ_{\mathbb{C}}^{-\nu} \zeta \circ_{\mathbb{C}}^{\nu/2} \mathbb{J}_{\zeta}$$

$$\mathcal{T}_z^{\mathbb{J}} = \int_{\mu_{\zeta}^0}^{\circ_{\mathbb{I}}} z \circ_{\mathbb{C}}^{-\nu} \zeta \circ_{\mathbb{C}}^{\nu/2} \mathbb{J}_{\zeta}$$

$$\mathbb{U} | \circ_{\mathbb{I}} \ni \mathcal{V} \stackrel{\text{covariance}}{\Rightarrow} \mathcal{V}^{\nu} \overline{\eta}^{\tau} \mathcal{V}^{-\nu} = \overline{\mathcal{V} \times \eta^{\tau}}$$

$$\overline{\zeta}^{\sigma} = \text{Weyl}$$

$$\mathbb{U} | \circ_{\mathbb{I}} \ni \mathcal{V} \stackrel{\text{covariance}}{\Rightarrow} \begin{cases} \mathcal{V}^{\nu} \overline{\zeta}^{\sigma} \mathcal{V}^{-\nu} = \overline{\zeta^{\sigma} \mathcal{V}^{-1}} \\ \mathcal{V}^{\nu} \overline{\eta}^{\sigma} \mathcal{V}^{-\nu} = \overline{\mathcal{V} \times \eta^{\sigma}} \end{cases}$$