$$\frac{1}{2} z v^{u} \underline{B_u} = -z \overset{\ast}{u} v - z \overset{\ast}{v} u + u \underbrace{u \overset{\ast\ast}{z} u} v + + u \underbrace{v \overset{\ast\ast}{z} u} u$$

$$S_\ell \xleftarrow{\widetilde{g}} S_\ell$$

$$T_{\widetilde{g}(u)} \left(S_\ell\right) \xleftarrow{T_u(\widetilde{g})} T_u \left(S_\ell\right)$$

$$T_u \left(S_\ell\right) \xleftarrow{h^{-1} T_u(\widetilde{g})} T_u \left(S_\ell\right)$$

$$T_u \left(S_\ell\right) = i X_u \times Z_u^{1/2}$$

$$T_u(\widetilde{g}) = \begin{array}{c|c} A_u & * \\ \hline 0 & \widetilde{g}'(u) \end{array}$$

$$\left(\widetilde{g_1 g_2}\right)'(u) = \widetilde{g}_1' \left(\widetilde{g}_2(u)\right) \widetilde{g}_2'(u)$$

$$\overline{\det T_u(\widetilde{g})} = \det A_u \overline{\det \widetilde{g}'(u)}^{2}$$

$$\lambda_w - {}^{u}\underline{\widetilde{\gamma}}_w = \begin{array}{c|c} \overset{\ast}{u}\left(w_1 + \overset{*}{w}_1\right) & 2 \overset{\ast}{u} w_{1/2} \\ \hline 0 & \overset{\ast}{u}\left(w_1 + \overset{*}{w}_1\right) - 2Q\left(w_0 {:} u\right) \end{array}$$

$$\mathtt{l} \xrightarrow[\text{alin}]{\mathtt{l}} \mathtt{l} \Longrightarrow \operatorname{tr} \mathtt{l}_{\mathbb{R}} = 0$$

$$Jz = iz \Longrightarrow J_{\mathbb{R}}^2 = -1_{\mathbb{R}}$$

$$\mathtt{l}_{\mathbb{R}} J_{\mathbb{R}} = -J_{\mathbb{R}} \mathtt{l}_{\mathbb{R}} \Longrightarrow \mathtt{l}_{\mathbb{R}} = J_{\mathbb{R}} \mathtt{l}_{\mathbb{R}} J_{\mathbb{R}}$$

$$\operatorname{tr} \mathtt{l}_{\mathbb{R}} = \operatorname{tr} J_{\mathbb{R}} \mathtt{l}_{\mathbb{R}} J_{\mathbb{R}} = \operatorname{tr} J_{\mathbb{R}}^2 \mathtt{l}_{\mathbb{R}} = \operatorname{tr} \left(-1_{\mathbb{R}}\right) \mathtt{l}_{\mathbb{R}} = -\operatorname{tr} \mathtt{l}_{\mathbb{R}}$$

$$x \in X_u$$

$$\mathrm{tr}^{\mathbb{R}}_{iX_u} \overset{*}{u}\, x = \left(1+\frac{a}{2}(\ell-1)\right) x|u$$

$$\mathrm{tr}^{\mathbb{C}}_{Z_u^{1/2}} \overset{*}{u}\, x = \frac{b+(r-\ell)\,a}{2} x|u$$

$$\mathrm{tr}^{\mathbb{R}}_{iX_u} \overset{*}{u}\, x = \sum_i \underbrace{y_i \overset{*}{u} x}|\,y_i = c_1 x|u$$

$$c_1 \ell = c_1 u|u = \sum_i \underbrace{y_i \overset{*}{u} u}|\,y_i = \sum_i y_i|\,y_i = \dim i X_u = \ell + \frac{a}{2}\ell(\ell-1) \Longrightarrow c_1 = 1+\frac{a}{2}(\ell-1)$$

$$Z_u^{1/2} = \sum_{1 \leqslant i \leqslant \ell < j \leqslant r} Z_{ij} \oplus \sum_{1 \leqslant i \leqslant \ell} Z_{i0}$$

$$\mathrm{tr}^{\mathbb{C}}_{Z_u^{1/2}} \overset{*}{u}\, x = \sum_j \underbrace{v_j \overset{*}{u} x}|\,v_j = c_2 x|u$$

$$c_2 \ell = c_2 u|u = \sum_j \underbrace{v_j \overset{*}{u} u}|\,v_j = \frac{1}{2}\sum_j v_j|\,v_j = \frac{1}{2}\dim Z_u^{1/2} = \frac{\ell b + \ell(r-\ell)\,a}{2} \Longrightarrow c_2 = \frac{b+(r-\ell)\,a}{2}$$

$$\mathrm{Re}\ \mathrm{tr}_{iX_u}\left(\lambda_w - {}^u\underline{\widetilde{\gamma}}_w\right) = \left(\frac{d}{r}+\frac{a}{2}(r-\ell)\right)(w|u+u|w)$$

$$\mathrm{Re}\ \mathrm{tr}\ \begin{array}{c|c} \overset{*}{u}\underbrace{w_1+\overset{*}{w}_1} & 2\overset{*}{u}w_{1/2} \\ \hline 0 & \overset{*}{u}\underbrace{w_1+\overset{*}{w}_1} - 2Q(w_0{:}u) \end{array} = \mathrm{tr}_{iX_u} \overset{*}{u}\underbrace{w_1+\overset{*}{w}_1} + \mathrm{Re}\ \mathrm{tr}_{Z_u^{1/2}} \overset{*}{u}\underbrace{w_1+\overset{*}{w}_1}$$

$${}^u\widetilde{\delta}_w = \frac{1}{2}\mathrm{tr}^{\mathbb{R}}_{iX_u} \overset{*}{u}\underbrace{w_1+\overset{*}{w}_1} + \mathrm{tr}^{\mathbb{C}}_{Z_u^{1/2}} \overset{*}{u}\underbrace{w_1+\overset{*}{w}_1} = \left(\frac{d}{r}+\frac{a}{2}(r-\ell)\right)\frac{w|u+u|w}{2}$$

$$\frac{1}{2}\left(1+\frac{a}{2}(\ell-1)+b+(r-\ell)\,a\right)\underbrace{w_1+\overset{*}{w}_1}|u = \left(1+\frac{a}{2}(\ell-1)+b+(r-\ell)\,a\right)\frac{w|u+u|w}{2}$$

$$= \left(1+a\left(r-\frac{\ell+1}{2}\right)+b\right)\frac{w|u+u|w}{2} = \left(\frac{d}{r}+\frac{a}{2}(r-\ell)\right)\frac{w|u+u|w}{2}$$