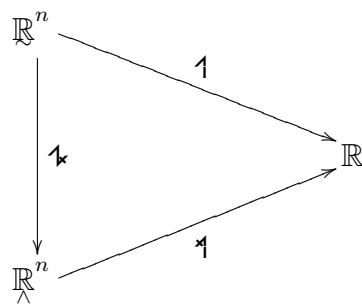


$$\int_{\mathbb{L}^N} \mathbb{L}^N = \overline{\mathbb{L}^N}$$

$$\int_{\mathbb{L}^N} \mathbb{L}^N \mathbf{1} = \int_{\overline{\mathbb{L}^N}} \mathbf{1}$$



$$\mathbf{1} \otimes \underbrace{\mathbb{L}^N \mathbf{1}} = \mathbb{L}^N \det \mathbf{1} \underbrace{\mathbf{1} \otimes \mathbf{1}}$$

$$\mathbf{1} \otimes \underbrace{\mathbb{L}^N \mathbf{1}} = \underbrace{\mathbf{1} \otimes \mathbb{L}^N} \underbrace{\mathbf{1} \otimes \mathbf{1}} = \mathbb{L}^N \det \mathbf{1} \underbrace{\mathbf{1} \otimes \mathbf{1}}$$

$$\int_{\mathbb{T}^N} \mathbb{T}^N \mathbb{A} = \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \int_{\mathbb{T}^N} \mathbb{A} \otimes \mathbb{T}^N \mathbb{A}$$

$$\begin{aligned} \text{LHS} &= \int_{\mathbb{T}^N} \mathbb{A} = \int_{\mathbb{T}^N} \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \mathbb{A} \otimes \mathbb{A} = \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \int_{\mathbb{T}^N} \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \mathbb{A} \otimes \mathbb{A} \\ &= \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \int_{\mathbb{T}^N} \mathbb{T}^N \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \mathbb{A} \otimes \mathbb{A} = \underbrace{\det \mathbb{A}}_{\mathbb{T}^N} \int_{\mathbb{T}^N} \mathbb{A} \otimes \mathbb{T}^N \mathbb{A} \end{aligned}$$