

$$\begin{array}{ccc}
 + \overline{\mathbb{H}}_{\infty} \overline{\mathbb{H}}_{\infty} \mathbb{U} | \mathbb{J} & \ni \overline{\mathbb{H}} \times & \\
 \downarrow \overline{\mathbb{H}} \overline{\mathbb{H}} & & \downarrow \\
 \overline{\mathbb{H}}_{\infty} \overline{\mathbb{H}}_{\infty} \mathbb{R}_N & \ni \overline{\mathbb{H}} \overline{\mathbb{H}} \times \overline{\mathbb{H}} &
 \end{array}$$

$$\overline{\mathbb{H}} \overline{\mathbb{H}} \times \overline{\mathbb{H}}_j = \overline{\mathbb{H}}_j$$

$$\overline{\mathbb{H}}_{\infty} \mathbb{J} \ni \overline{\mathbb{H}} \times \overline{\mathbb{H}}_j = \overline{\mathbb{H}}_i \overline{\mathbb{H}} \overline{\mathbb{H}} \times \overline{\mathbb{H}}_j = \overline{\mathbb{H}}_i \overline{\mathbb{H}}_j$$

$$\overline{\mathbb{H}}_i = \overline{\mathbb{H}} \overline{\mathbb{H}} \times \overline{\mathbb{H}}_j \in \overline{\mathbb{H}}_{\infty} \overline{\mathbb{H}}_{\infty} \mathbb{R}_N \text{ 1-form matrix}$$