

$$I(d, \{p\}) \rightarrow \int_{(\mathbb{R}^d)^n} \mathrm{d}^d k_1 \dots (1 + \alpha d \delta_{q_j k_i}) \mathrm{d}^d k_i \dots \mathrm{d}^d k_l \left( f + \alpha q_j \cdot \frac{\partial}{\partial k_i} f \right)$$