have that the inner integral equals:

$$\int_{B_r} \mathbb{E}\Big[\int_\varepsilon (\nabla X(t)) \, \mathbb{E}\Big[L_{j\sigma(j)} \prod_{i=1}^{j-1} \Big]$$

$$\times \int_{B_r} L^{K''_{j\sigma(j)}} \sum_{L} \Big(|X(t)| \prod_{i=1}^{j-1} |\nabla^2 f(t)_{i\sigma(i)}| \times \prod_{k=j+1}^{p} |\nabla^2 f(t_0)_{k\sigma(k)}| \Big) \Big]$$

$$= \int_{B_r} \mathbb{E}\Big[\delta_\varepsilon(\nabla X(t)) \, L^{K''_{j\sigma(j)}} \sum_{L} \mathbb{E}\Big[|X(t)| \prod_{i=1}^{j-1} |\nabla^2 f(t)^{k_i}_{i\sigma(i)}| \times \prod_{k=j+1}^{p} |\nabla^2 f(t_0)^{k_k}_{k\sigma(k)}| \Big] |\nabla X(t)| \Big]$$

cts so bounded by e.g. C.

$$\leq C L^{K''_{j\sigma(j)}} \int_{B_r} \mathbb{E}\big[\delta_\varepsilon(\nabla X(t)) \big]$$