LKC ~~disjoint~~ additivity (general D)

$$\mathbb{E}[\chi(A_u(A \dot\cup B))] = \mathbb{E}[\chi(A_u(A))] + \mathbb{E}[\chi(A_u(B))]$$

$$\Rightarrow \sum_{j=0}^{D} \mathcal{L}_j(A \dot\cup B)\rho_j(u) = \sum_{j=0}^{D} \left(\mathcal{L}_j(A) + \mathcal{L}_j(B)\right)\rho_j(u). \quad \forall u$$

hermite polys are orthogonal.

$$\Rightarrow \quad \mathcal{L}_j(A \dot\cup B) = \mathcal{L}_j(A) + \mathcal{L}_j(B) \; ! \; ..$$

Actually: $\forall A, B, \forall j$

$$\boxed{\mathcal{L}_j(A \cup B) = \mathcal{L}_j(A) + \mathcal{L}_j(B) - \mathcal{L}_j(A \cap B)}$$

$$\mathbb{E}[\chi(A_u(A \cup B))] = \mathbb{E}[\chi(A_u(A))] + \mathbb{E}[\chi(A_u(B))] - \mathbb{E}[\chi(A_u(A \cap B))]$$

$$\Rightarrow \sum_{j=0}^{D} \mathcal{L}_j(A \cup B)\rho_j(u) = \sum_{j=0}^{D} \left(\mathcal{L}_j(A) + \mathcal{L}_j(B) - \mathcal{L}_j(A \cap B)\right)\rho_j(u) \quad \forall u$$

hermite polys.