1135-47-2536 **Lara Ismert***, lara.ismert@huskers.unl.edu. *A weakly-defined derivation* δ_w^D *and kernels of* $(\delta_w^D)^n$.
Given a (possibly unbounded) self-adjoint operator D acting on a Hilbert space H, an operator $x \in B(H)$ is said to be n-times weakly D-differentiable if for every $\xi, \eta \in H$, the function $t \mapsto \langle e^{itD} x e^{-itD} \xi, \eta \rangle$ is n-times continuously differentiable. Christensen proved that this definition is equivalent to requiring that for all $k = 1, .., n$, we have $x(\text{dom } D^k) \subseteq \text{dom } D^k$ and the k-times nested commutator $[D, ..., [D, x]]$ is well-defined and bounded on dom D^k. If x satisfies this condition, we denote the unique extension of the n^{th} nested commutator $[D, ..., [D, x]]$ to all of H by $(\delta_w^D)^n(x)$. Nested commutators of this form play a significant role in quantum mechanics. In particular, perturbational computations can be simplified if any number of these nested commutators vanish. In this talk, we will examine how the multiplicity of D affects the kernels of powers of the derivation δ_w^D. (Received September 26, 2017)