In this talk, I will introduce different kinds of invariant for classification of $C^*$-algebras, such as the Elliott invariant, extended Elliott invariant, Stevens invariant, $\text{inv}_0(\cdot)$ and $\text{inv}(\cdot)$. I will show some classification results to let you know how powerful those invariants are. Furthermore, I will study the relation between those invariants.

The extended Elliott invariant contains the Elliott invariant and all extended valued traces. It characterizes the ideal structure of $C^*$-algebras. I will show that the extended Elliott invariant and Stevens invariant are equivalent when we consider stably finite $C^*$-algebras with the ideal property. For invariants $\text{inv}_0(\cdot)$ and $\text{inv}(\cdot)$, where the former is a subset of the latter, I will show that they are equivalent for AH-algebras with finitely many ideals. (Received August 26, 2019)