There are various resonant tanks for constructing resonant converters. In this paper, the equivalence relations of resonant tanks are investigated, which bring a new perspective for analysis of resonant converters. On one hand, the equivalence relations can help select suitable resonant converter topologies for specific applications, which is illustrated by the examples of the LLC resonant converter and CLL resonant converter, and LCC resonant converter and hybrid series-parallel resonant converter (HSPRC). On the other hand, the equivalence relations can help to simplify the design of some high-order resonant converters, which is illustrated by the example of the LLC resonant converter and LLC-L resonant converter.