**Proof** for solution to the RLC circuit:

To prove the solution for the simplest LRC circuit you can use http://physics16.weebly.com/uploads/5/9/8/5/59854633/2054\_ch21a.pdf

or you can use the solution in the form of $i=Asin\left(ωt\right)+Bcos(ωt)$ and find A and B by substituting this solution to the differential equation.