a)

It is called as ‘Twelve-Pulse Rectifier’. This topology is used for improving dc output over single phase rectifier. Output has less harmonics, the frequency of output is 6 times of input. In addition, there are two transformers, one of them Y-Delta, other one is Y-Y. Y-Delta is required to create a 30 degree phase shift. So, six phase is created by using only transformers and three phase sources.

Dc output is the sum of 2 rectifying unit.



Equation 1

For diode rectifier, firing angle is zero. Equation 1 shows that average output voltage is bigger than full bridge diode rectifier.

Kind of this topologies are used in the high voltage DC application.

The multi phase converters like 12 pulse branch single-way and bridge rectifier. Some converters are 3 phase single way, 6 phase single phase, 6 pulse bridge. This rectifier are compared in average output level, output ripple frequency, output ripple. Number of phase increases the output voltage and decreases the ripple and ripple frequecny. In addition, bridge rectifers are better than single way rectifiers with respect to output voltage and ripple value if the phase numbers are equal.

b)

# Simulation Setup and Result for 12-Pulse Rectifier

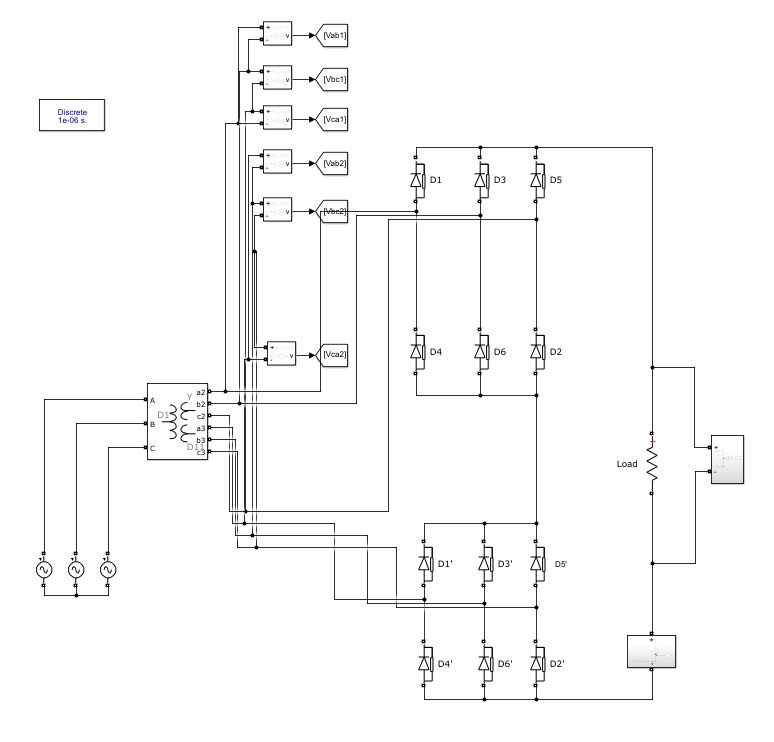


Figure 1

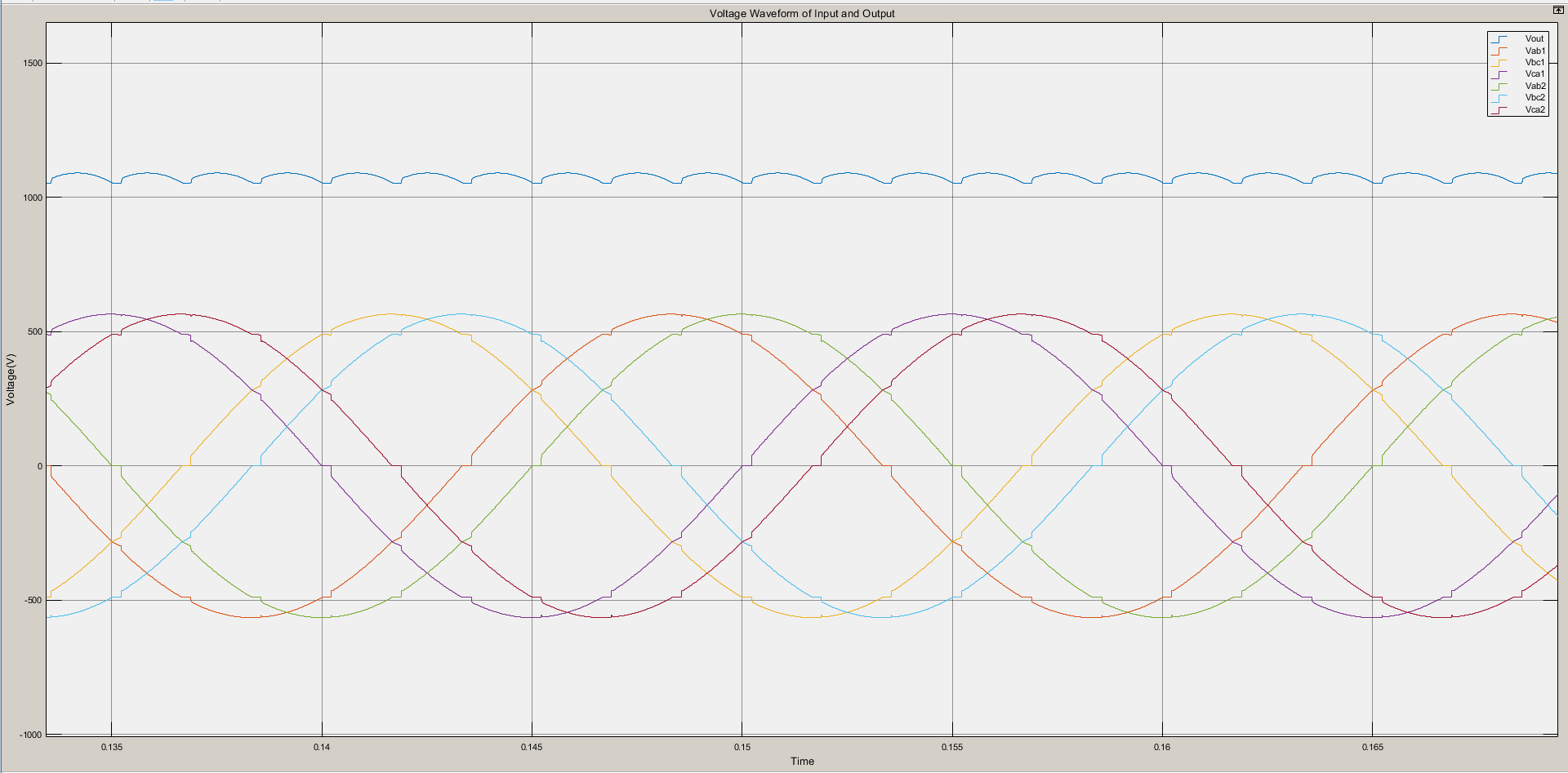


Figure 2

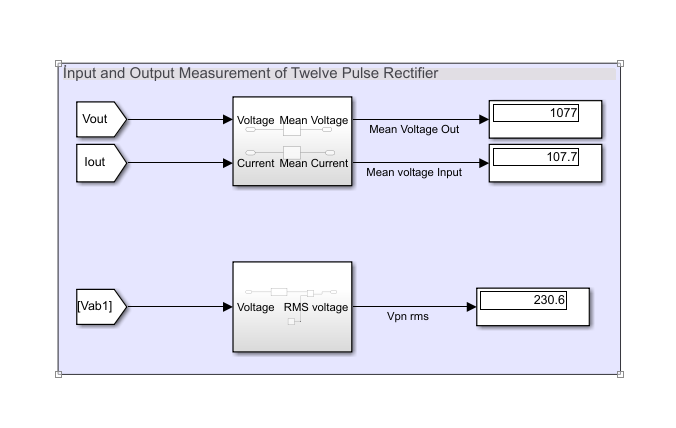


Figure 3

# Simulation Setup and Result for Full Bridge Rectifier

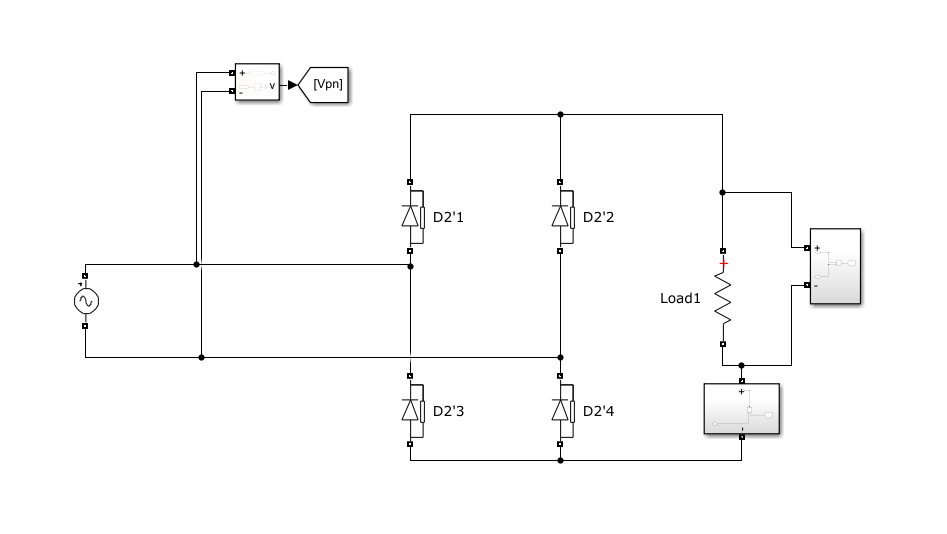


Figure 4

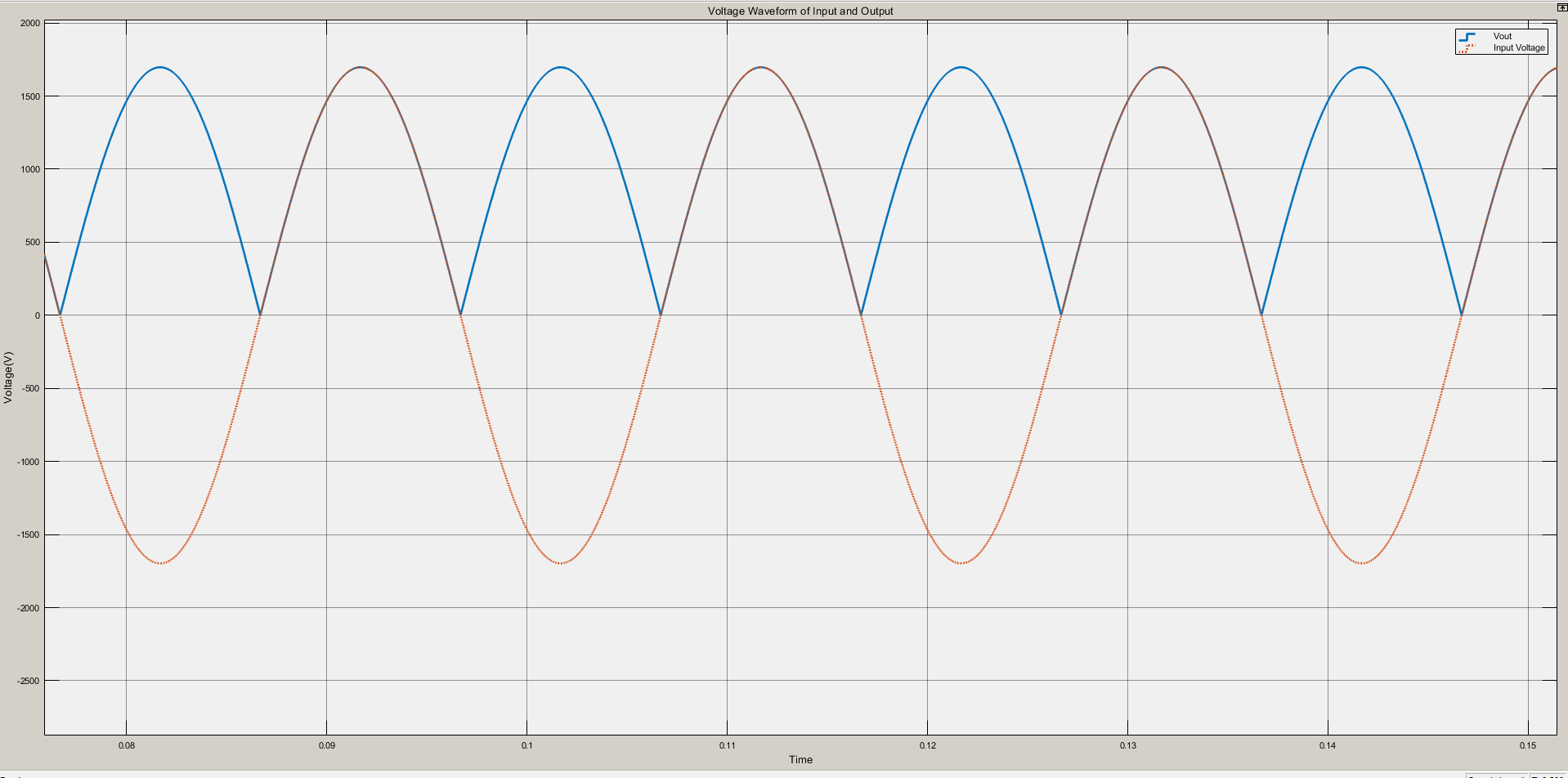


Figure 5

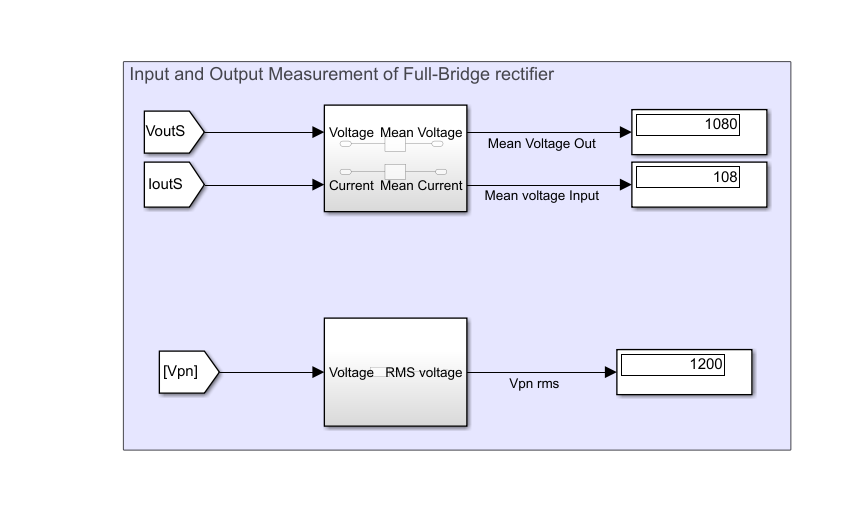


Figure 6