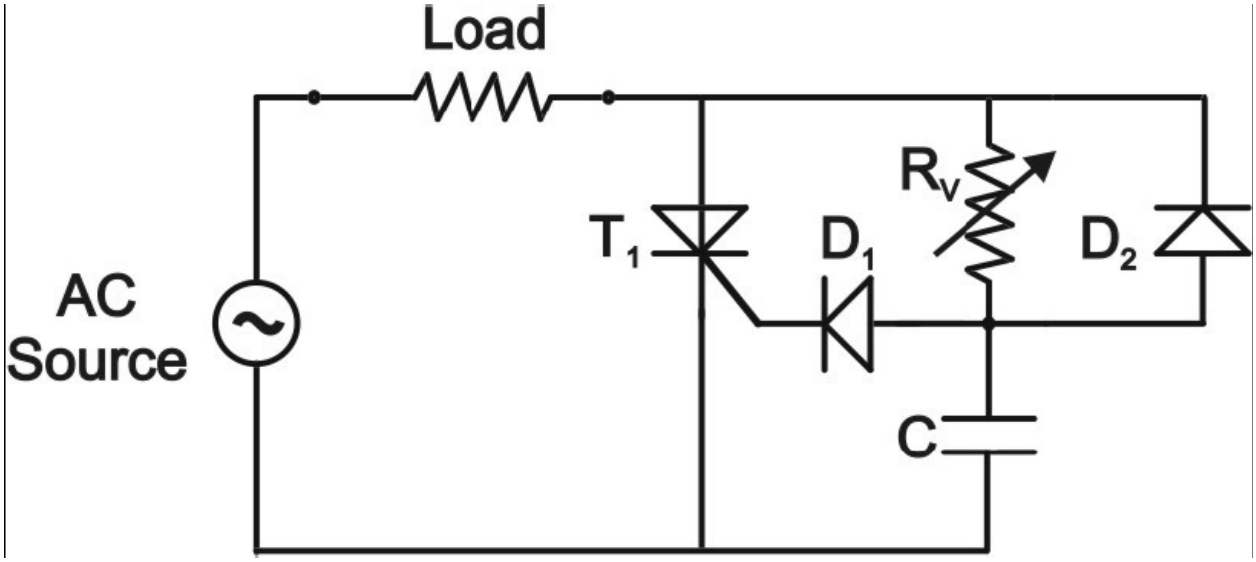
Resistance capacitance firing circuit

Resistance capacitance firing circuit methods are two types

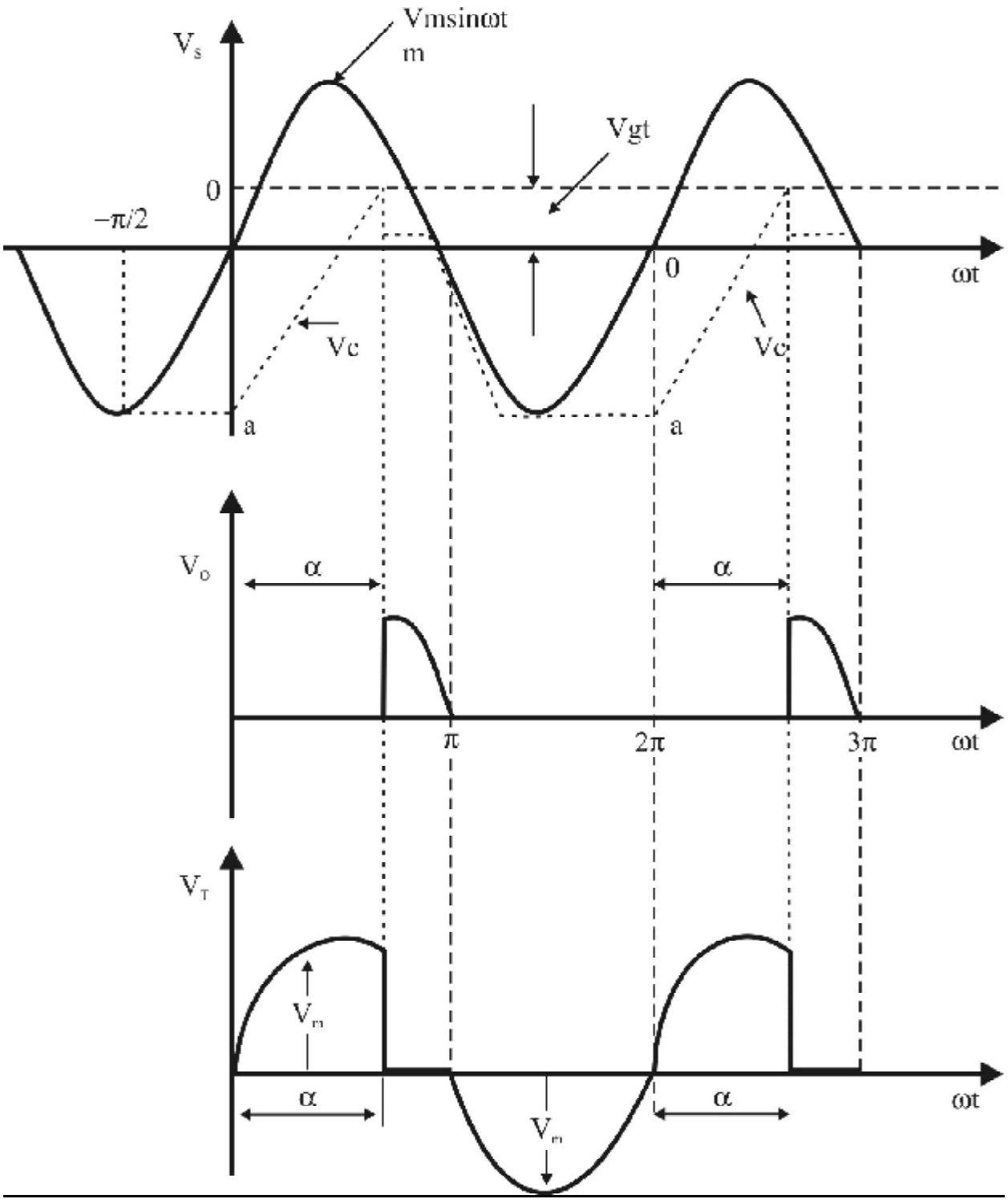
a. Resistance capacitance half wave firing circuit.
b. Resistance capacitance full wave firing circuit.

(a) Resistance capacitance half wave firing circuit:

The triggering angle control limitation of the diode resistance triggering circuit can be overcome by the diode-resistance-capacitance triggering circuit.. The figure shows the RChalf wave trigger circuit. The conduction period can be controlled from 0° to180° range. By varying the value of R_V, the trigger can be controlled from 0 to π. In the negative half cycle ,capacitor C charges through D_2 with lower plate positive to the peak supply voltage V_M at ωt = -90°. After ωt = -90°, source voltage V_S decreases from $–V_M$ at ωt = -90° to zero at ωt=0°.During this period, capacitor voltage V_C may fall from $–V_M$ at ωt = -90° to some lower value -0α at ωt=0°. Now the SCR anode voltage passes through zero and become s positive, C begins to charge through variable resistance R_V from initial voltage -0α. When capacitor charges to positive voltage equal to gate trigger voltage V_{gt}, SCR is fired and after this, capacitor holds to a small positive voltage. Diode D_1 is used to prevent the break down of cathode to gate junction through D_2 during the negative half cycle. In the resistance capacitance firing method the firing angle can never be zero and 180°.SCR will trigger when $V_C = V_{gt} + V_d$, where V_d is the voltage drop across the diode D_1.The current Igt must be supplied by voltage source through variable resistance R_V, D_1 and gate to cathode circuit . The variable resistance R_V is maximum, time taken for C charge from -0α to $V_{gt} + V_d$ then V_{gt} is more, firing angle is also more and therefore average output voltage is minimum. The variable resistance R_V is less, firing angle is low and therefore average output voltage is maximum.

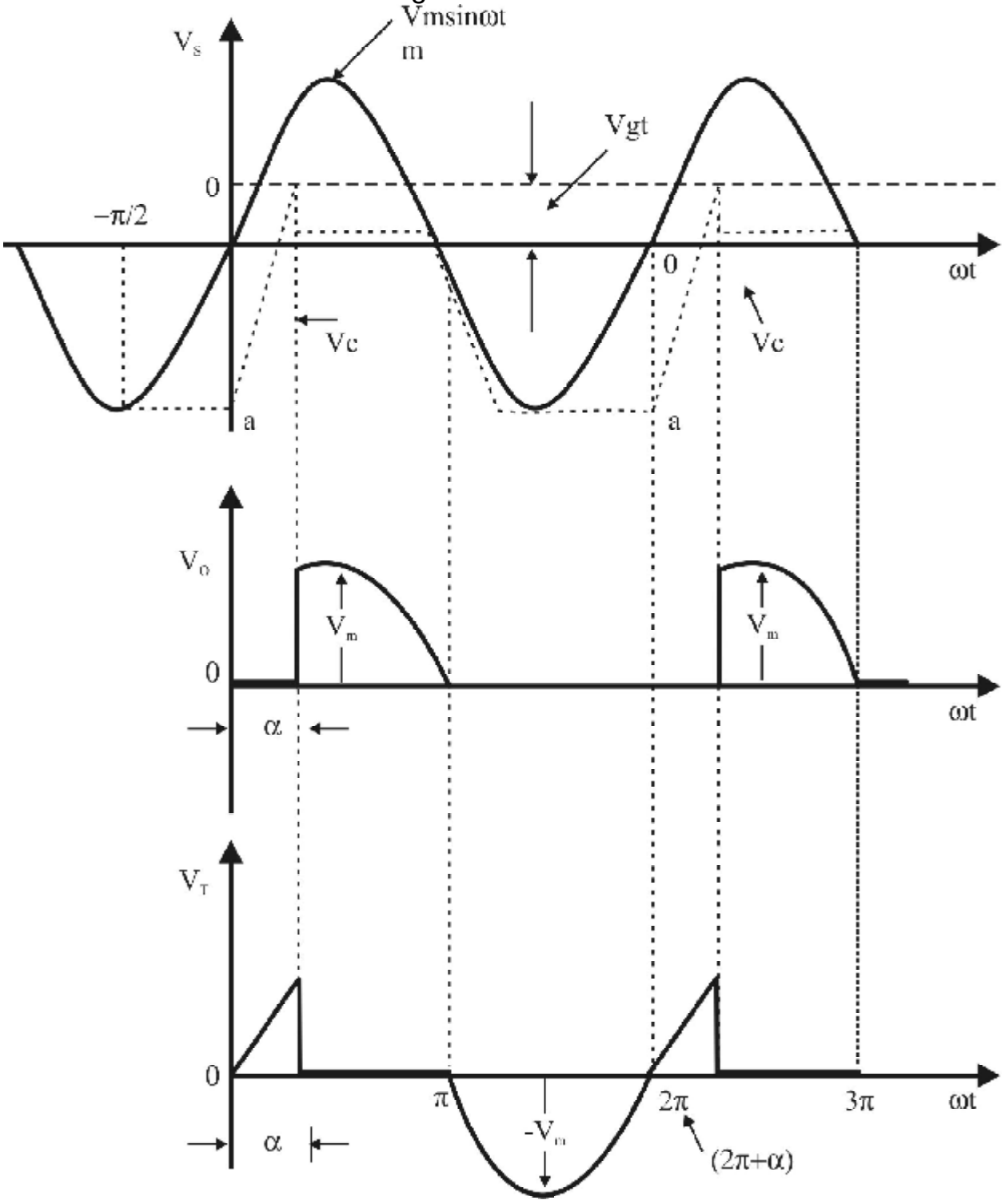


Resistance Capacitance Firing Circuit (half wave)



Waveform for high value of variable resistance RV

Waveform of RC half wave firing circuit Waveform



Waveform for low value of variable resistance R_V