

Lab # 04

Modeling an AC Source

Aim:

In this lab we will learn about how to model an AC source.

Theory:

AC source is denoted by $V_m \sin \omega t$

Where

V_m is the magnitude of the wave

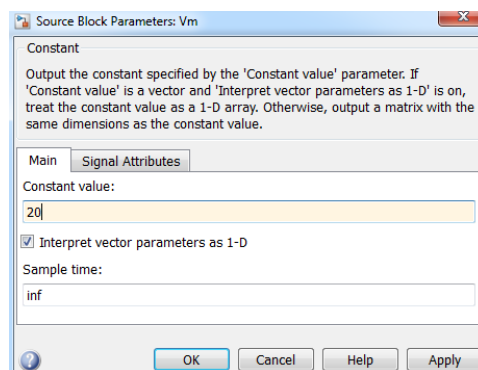
Sin is the function of the wave

ω is the angular frequency and its unit is rad per sec, and

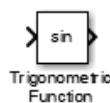
t is for time in second.

Procedure:

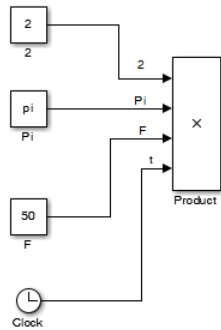
To model an AC source, V_m is nothing but a constant value so pick constant block from Simulink library. Give it the value = 20.



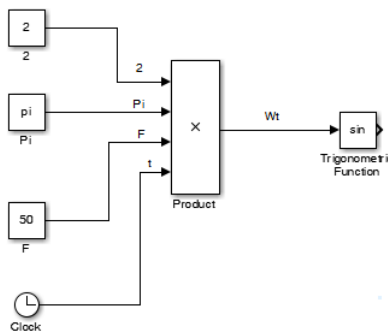
Now for Sin function go to math operation and then pick on trigonometric function. By double clicking on this block we have different functions we have to select the sin function.



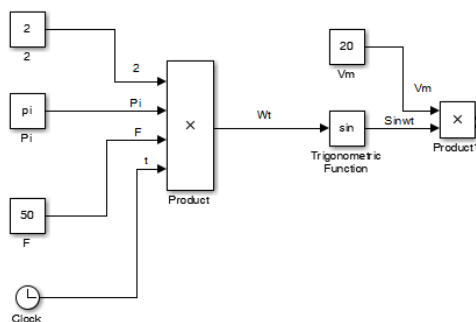
ωt is the function of sine. And ω is equals $2\pi f$. Here 2, π and f is a constant value so pick constant blocks for them. Now double click on these blocks and change simply the value to 2, pi and 50 respectively. Now this $2\pi f$ is in product so pick product block for them and by double clicking on it change the number of input to 4 because of three inputs and one for t. For t go to Simulink library and then click on sources and take clock. So we get $2\pi ft$ which will give us the product of ωt in the output.



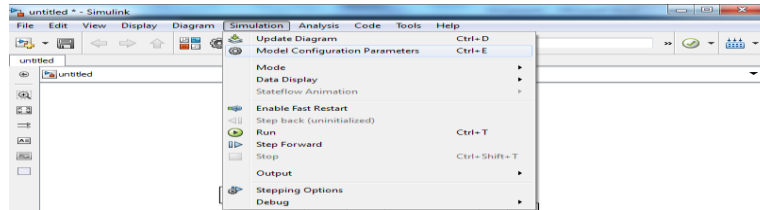
Now give this ωt output on sin function input.



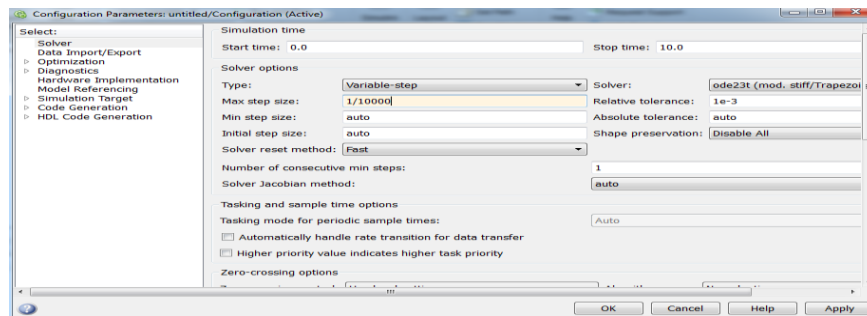
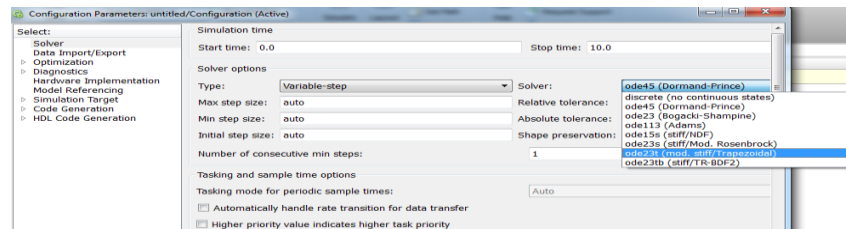
Now our desired equation is $V_m \sin \omega t$ it means that V_m is in product with the $\sin \omega t$ so multiply them we get.



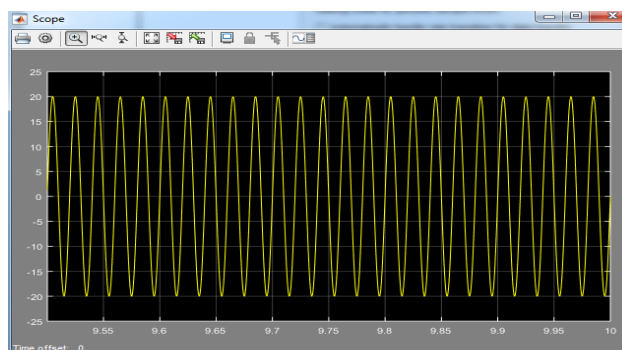
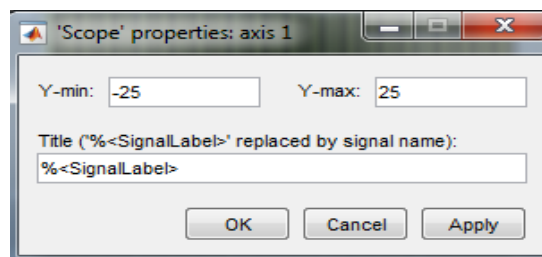
Now to check the outputs connect the scope and then click on the simulation and then on Model configuration parameters.



Change the solver to trapezoidal and change the Max step size to 1/10000.



Now click on run button and then click on scope change the Y-min and Y-max value greater than the V_m value so we enter -25 and 25 respectively. So we get our desired sinusoidal wave form.



Lab Task:

By using an AC source simulate RC circuit by modeling method. Find the parameters (voltage, current and power) across each component. Give your Id number as the values for the constant blocks.

Marks Obtained:

Remarks: