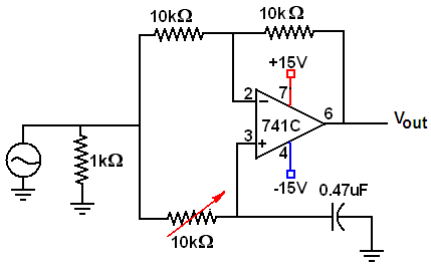
Electronics

Opamp de-phaser

Problem 1.- In SCR circuits, a de-phase angle is used to control the final output voltage. Design a circuit that produces a 30° de-phase in a 60Hz signal.

Solution: The following circuit produces a phase shift:



To produce 30° at 60Hz we need:

$$30^{\circ} = 2\tan^{-1}(2\pi fRC) \rightarrow \frac{\tan 15^{\circ}}{2\pi f} = RC = 7.1\times 10^{-4}\, s$$

This can be achieved with R = 1.5kΩ in the circuit shown above.

Problem 1a.- What could you do if you need a phase shift of 15 degrees in a 50Hz signal for a variable frequency drive?

Problem 2.- Design a circuit that takes a 4.4kHz sinusoidal of 0.15 V RMS, shifts its phase 45° and rectifies the positive part of the signal.