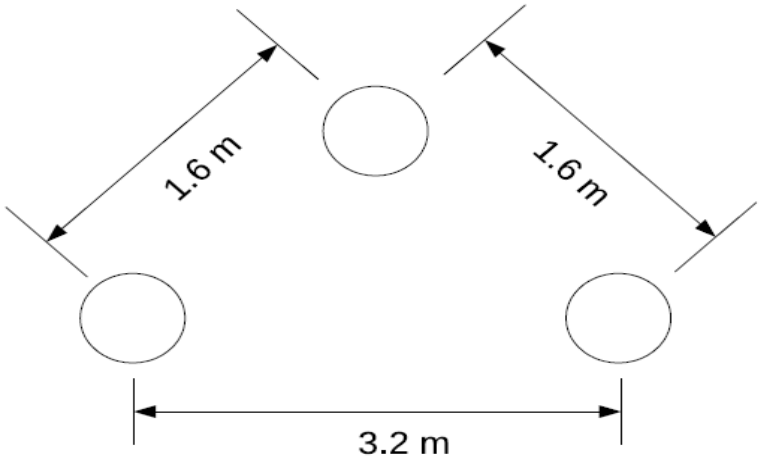
Tutorial 2

1. A single-phase transmission line, 50 km long, is made up of a hard-drawn copper conductor 1.27 cm in diameter. Find the loop resistance at (a) 20° C, and (b) 80 °C. Take the resistivity and temperature coefficient of the copper at 20° C to be 1.77 $\mu\Omega \cdot cm$ and 0.00382 C^{-1}.

2. A 3 phase 50 Hz transmission line has its conductors arranged in a triangular formation so that two of the distances between conductors are 30 ft and the third is 50 ft. The conductors are ACSR Osprey. Determine the capacitance to neutral in microfarads per mile and the capacitive reactance to neutral in ohm miles. If the line is 150 miles long, find the capacitance to neutral and capacitive reactance of the line. From standard table, GMR=0.0284 ft (convert this into meters), outside diameter of each conductor is 0.879 inches (convert this into meters).

3. Determine the inductance of a 3-phase line operating at 50 Hz and conductors arranged as given in figure. The conductor's diameter is 1 cm.



4. Find the inductive reactance per phase in ohm /m and the capacitive reactance to neutral in ohm-m for a three-phase line that has equilaterally spaced conductors of ACSR 'Dove. The distance between lines of various phases is 4 m and the operating frequency is 50 Hz. From standard table, Dove GMR = 0.00954024 m, Dia of Conductor = 0.02354 m.