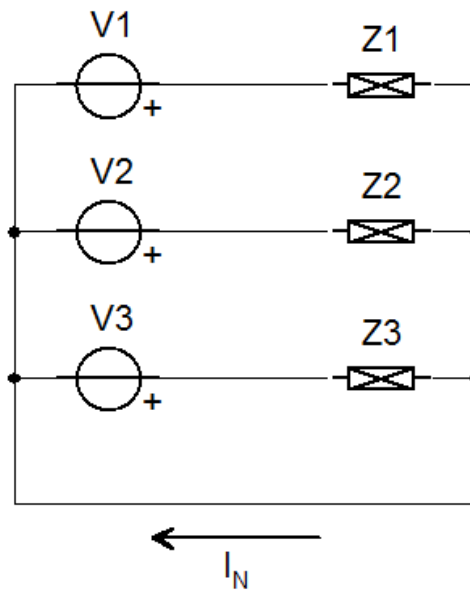**COLORADO SCHOOL OF MINES**
ELECTRICAL ENGINEERING & COMPUTER SCIENCE DEPARTMENT

EENG-382
Engineering Circuit Analysis (Circuits II)
Spring 2014

Handwritten Homework #1 (HW01)

Problem #1

a) If each voltage source is independent (i.e., has its own magnitude and phase) and each impedance is independent, find an expression for the phasor current I_N in the bottom wire?

b) If $V_1 = 120V\angle35°$, $V_2 = 100V\angle-55°$, $V_3 = 150V\angle165°$ and $Z_1 = (40+j70)\Omega$, $Z_2 = (20-j35)\Omega$, $Z_3 = 60\Omega\angle50°$, what is I_N?

c) If all three impedances are equal to Z, what is the constraint that applies to the three voltages in order for I_N to be identically zero?

d) If, in addition to all three impedances being equal, all three voltage sources have the same magnitude, what is the constraint that applies to the three phase angles in order for I_N to be identically zero.