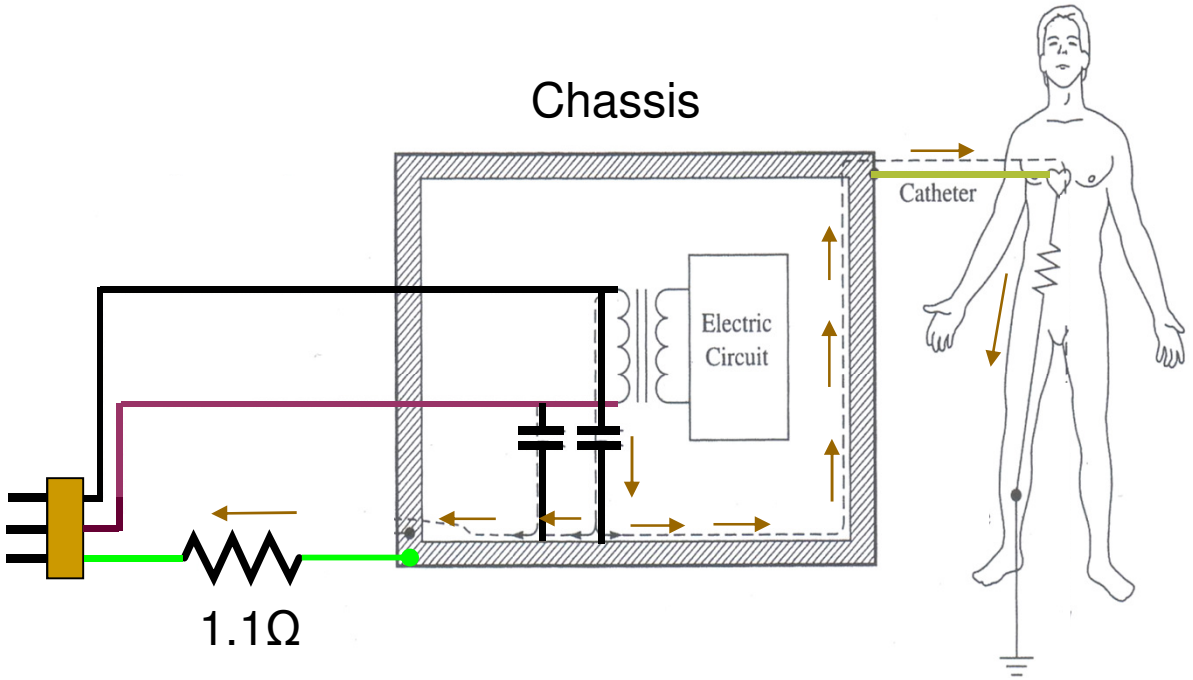
Tutorial 4

Question 1: Suppose that the leakage current is 100 μA. If the ground wire resistance is 1.1Ω and a patient of 500-Ω resistance touches the instrument metal case, what is the body current?



Question 2 A power engineer receives a lethal macroshock while standing in water and simultaneously touching the ungrounded metal casing on a high-voltage, 60-Hz power transformer. Assume that the resistance of the skin on the engineering's hand is 100 kΩ and the resistance of the skin on the engineer's feet is negligible. A capacitance of 25 nF is measurement between the transformer casing and the high-voltage conductors. Find the minimal value of the high voltage, assuming that 75 mA is the minimal fibrillating macroshock. Draw an equivalent circuit.

Question 3 Calculate the maximal safe capacitance between a liquid-filled catheter and dc-isolated pressure-sensor leads for a 120-V, 60-HZ fault in the sensor leads. Assuming that 10 uA is the minimal fibrillating microshock.