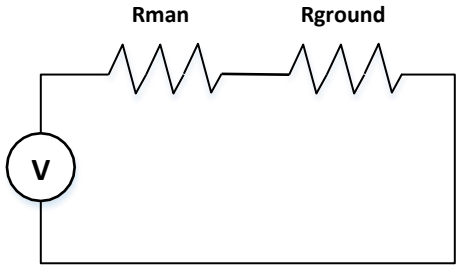
ELEC-E8422 An Introduction to Electric Energy

Homework 8: Electric Safety

Because of a fault in wiring connections, a voltage of 230 V appears in bath room shower tap. The resistance between the floor and electrical system neutral (i.e. ground) has been measured to be 20 kΩ. A person whose body resistance is 1 kΩ takes a shower. How large a current flows through his/her body? What is the consequence to the person? (use Thevenin's method for calculation).

Solution of Homework 8

The equivalent circuit diagram is as follows.



$$R_{total} = R_{man} + R_{ground} = 21\ KOhm$$
$$I = \frac{V}{R_{total}} = \frac{230}{21000} = 10.95\ mA$$

The consequence would be loss of muscle control for the man.