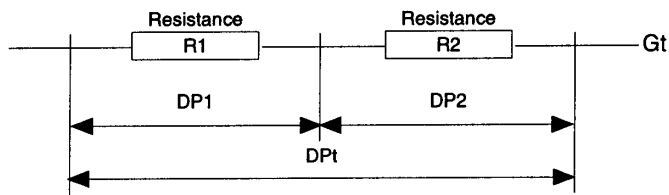


Resistances in series



From the flows we get $G_1 = G_2 = G_t$ (1)

From the pressure drops we get $DP_t = DP_1 + DP_2$ (2)

From the resistances we get $R_1 = DP_1 / G_t^2$ (3)

$R_2 = DP_2 / G_t^2$ (4)

Hence $DP_1 = R_1 \cdot G_t^2$ (5)

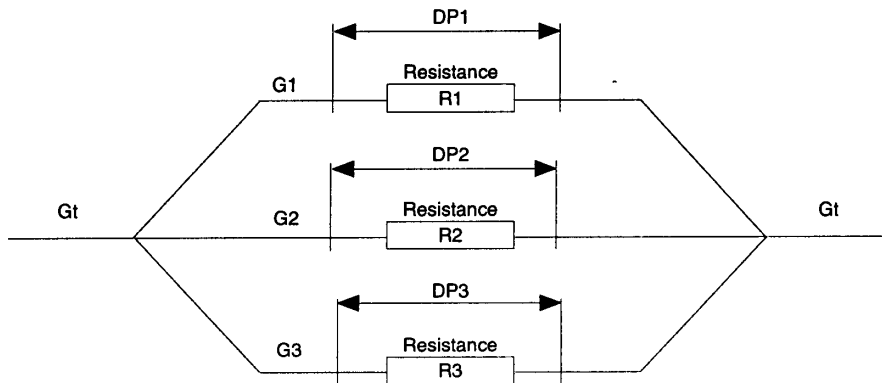
$DP_2 = R_2 \cdot G_t^2$ (6)

$DP_t = R_t \cdot G_t^2$ (7)

Substituting from (5), (6) and (7) into (2) we get

$R_t = R_1 + R_2$ (8)

Resistances in parallel



From the flows we get $G_t = G_1 + G_2 + G_3$ (9)

From the pressure drops we get $DP_t = DP_1 = DP_2 = DP_3$ (10)

From the resistances we get $R_1 = DP_1 / G_1^2$ (11)

$R_2 = DP_2 / G_2^2$ (12)

$R_3 = DP_3 / G_3^2$ (13)

$R_t = DP_t / G_t^2$ (14)

Hence $G_1 = (DP_1 / R_1)^{0.5}$ (15)

$G_2 = (DP_2 / R_2)^{0.5}$ (16)

$G_3 = (DP_3 / R_3)^{0.5}$ (17)

$G_t = (DP_t / R_t)^{0.5}$ (18)

Substituting from (15), (16), (17) and (18) into (9) we get

$(1/R_t)^{0.5} = (1/R_1)^{0.5} + (1/R_2)^{0.5} + (1/R_3)^{0.5}$ (19)

Hence $R_t = 1 / ((1/R_1)^{0.5} + (1/R_2)^{0.5} + (1/R_3)^{0.5})^2$ (20)

From (15) and (18) we get $(G_1 / G_t) = (DP_1 / R_1)^{0.5} / (DP_t / R_t)^{0.5}$ (21)

Hence $G_1 / G_t = (R_t / R_1)^{0.5}$ (22)