

$$F_a(t) = F_Z(t) + F_L = F_C(t) + F_R(t)$$

$$F_Z(t) = \frac{P_a(t) - P_p(t)}{Z} \quad F_C(t) = \frac{cd P_p(t)}{dt}$$

$$F_L(t) = \frac{1}{L} \int [P_a(t) - P_p(t)] dt \quad F_R(t) = \frac{P_p(t)}{R}$$

Procedimiento algebraico

$$P_a(t) = \frac{P_p(t)}{Z} + \frac{1}{L} \int [P_a(t) - P_p(t)] dt = \frac{cd P_p(t)}{dt} + \frac{P_p(t)}{R}$$

$$\underline{P_a(s)} = \frac{\underline{P_p(s)}}{Z} + \frac{\underline{P_a(s)} - \underline{P_p(s)}}{LS} = CS \underline{P_p(s)} + \frac{\underline{P_p(s)}}{R}$$

$$\left(\frac{1}{Z} + \frac{1}{LS} \right) \underline{P_a(s)} = \left[CS + \frac{1}{R} + \frac{1}{Z} + \frac{1}{LS} \right] \underline{P_p(s)}$$

$$\underline{P_a(s)} = \left(\frac{CS + \frac{1}{R} + \frac{1}{Z} + \frac{1}{LS}}{\frac{1}{Z} + \frac{1}{LS}} \right) \underline{P_p(s)}$$

$$\left[\frac{CS + \frac{1}{R}}{ZLS} \right] = \frac{\frac{CS}{Z} + \frac{1}{R}}{LS} = \frac{(CSR + 1)}{RZ} + \frac{1}{Z} = \frac{CSR + Z + R}{RZ}$$

$$\frac{CSR + Z + R}{RZ} + \frac{1}{LS} = \frac{CSR^2 + LSZ + RLS}{LSRZ} + \frac{1}{LS}$$

$$\frac{CSR^2 + LSZ + RLS + RZ}{LSRZ}$$

$$P_{a(S)} = \left(\frac{CS^2 RZ + LSZ + RLZ}{LSRZ} \right) P_{a(S)}$$

$LS + Z$

ZLS

$$\frac{P_{a(S)}}{P_{p(S)}} = \frac{-(ZLS)(CS^2 RZ + LSZ + RLZ)}{(LS + Z)(LSRZ)}$$

$$\frac{CS^3 ZLR + L^2 S^2 Z^2 + 2L^2 S^2 R + 2Z^2 LRS}{L^2 S^2 RZ + LSRZ^2}$$

$$\frac{P_{p(S)}}{P_{a(S)}} = \frac{L^2 S^2 RZ + LSRZ^2}{CS^3 ZLR + L^2 S^2 Z^2 + 2L^2 S^2 R + 2Z^2 LRS}$$

$$SLE(LSR + RZ)$$

$$SLE(CS^2 RZ + LSZ + LSR + ZR)$$

$$\frac{P_{a(S)}}{P_{p(S)}} = \frac{LSR + RZ}{S^2 CLRZ + LSZ + LSR + ZR}$$

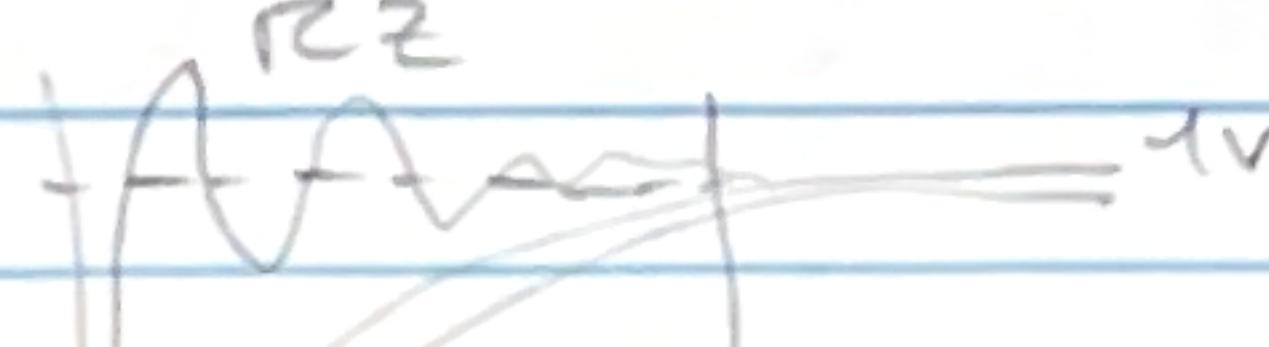
$$\frac{P_{p(S)}}{P_{a(S)}} = \frac{RLS + RZ}{CLRZS^2 + S(LZ + LR) + ZR}$$

Error en estudio estacionario

$$e(S) = \lim_{S \rightarrow \infty} S P_{a(S)} \left[1 - \frac{P_{p(S)}}{P_{a(S)}} \right]$$

$$= \lim_{S \rightarrow \infty} S \left[1 - \frac{RLS + RZ}{CLRZS^2 + (LZ + RL)S + RZ} \right]$$

$$= 1 - \frac{RZ}{RZ} = 0$$



transitorio estudio estacionario
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