



Disciplina: Controle e Servomecanismos I



Atividade: **Revisão de Diagramas de Blocos**

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Referências

- Castrucci, P. B. L., Bittar, A. & Sales, R. M. (2018). Controle Automático, 2ª edição, LTC. (*)
- Castrucci, P. B. L., Bittar, A. & Sales, R. M. (2011). Controle Automático, LTC.

(*) Organizado para a 2ª edição, Seção 2.6.

CONEXÕES BÁSICAS

EM DIAGRAMAS DE BLOCOS

NO DOMÍNIO DA TRANSFORMADA

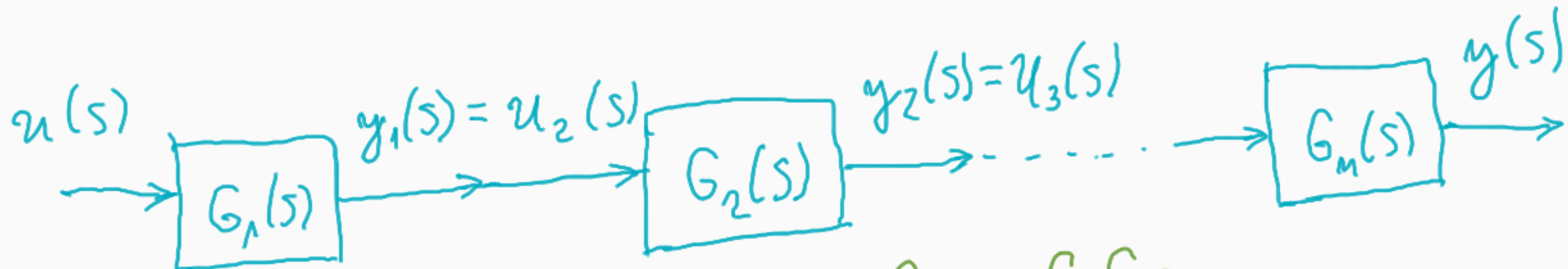


$$y(s) = G(s)u(s) \quad \text{DE LAPLACE}$$

$$y(t) = g(t) * u(t)$$

NO DOMÍNIO DO TEMPO

① CONEXÃO EM CASCATÁ (CONEXÃO SÉRIE)



$$u_2 = y_1 = G_1 u$$

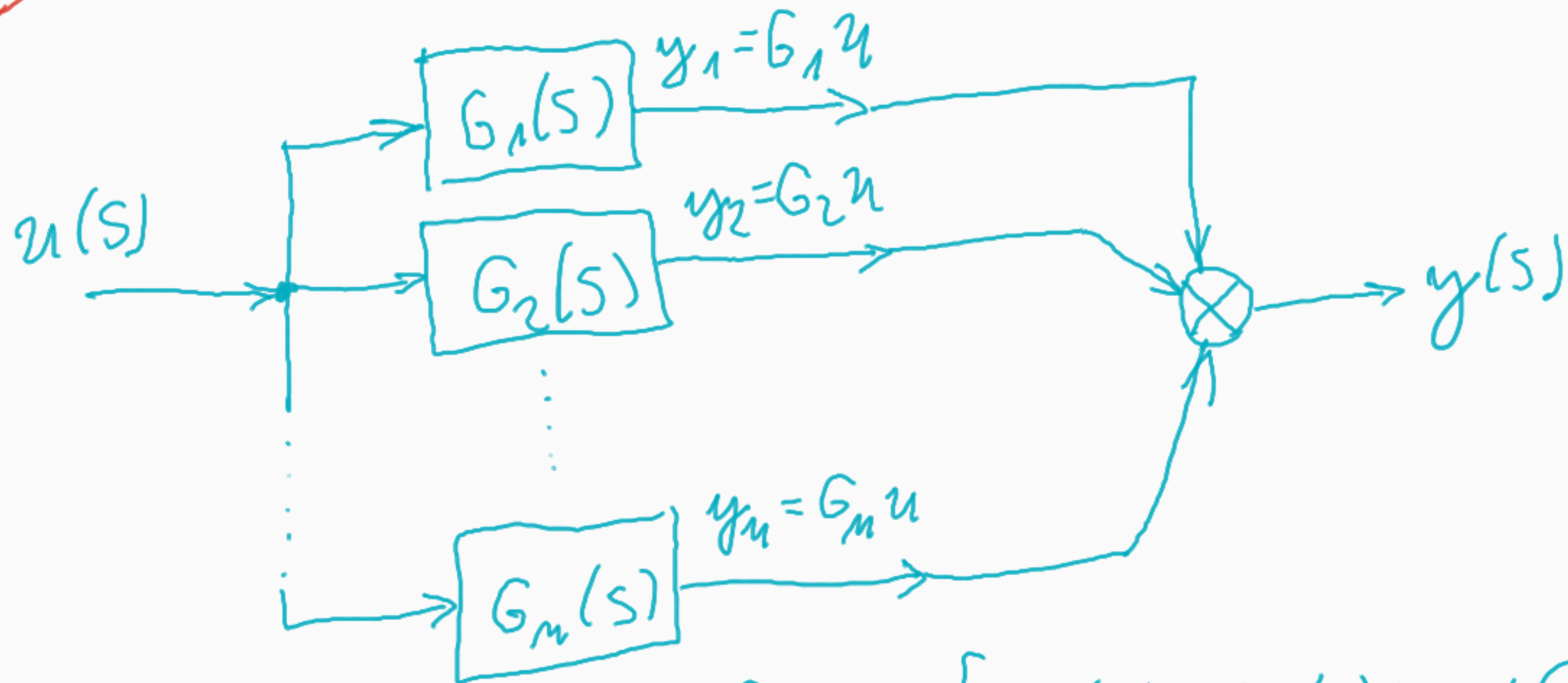
$$y_2 = G_2 u_2 = G_2 G_1 u \dots$$

$$y(s) = G_n(s) \dots G_1(s) u(s)$$

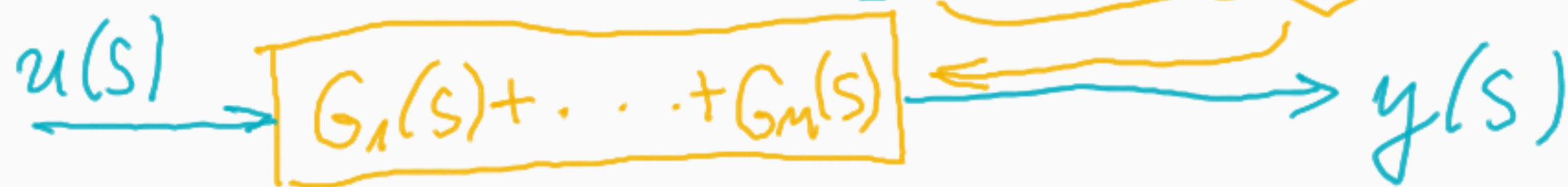


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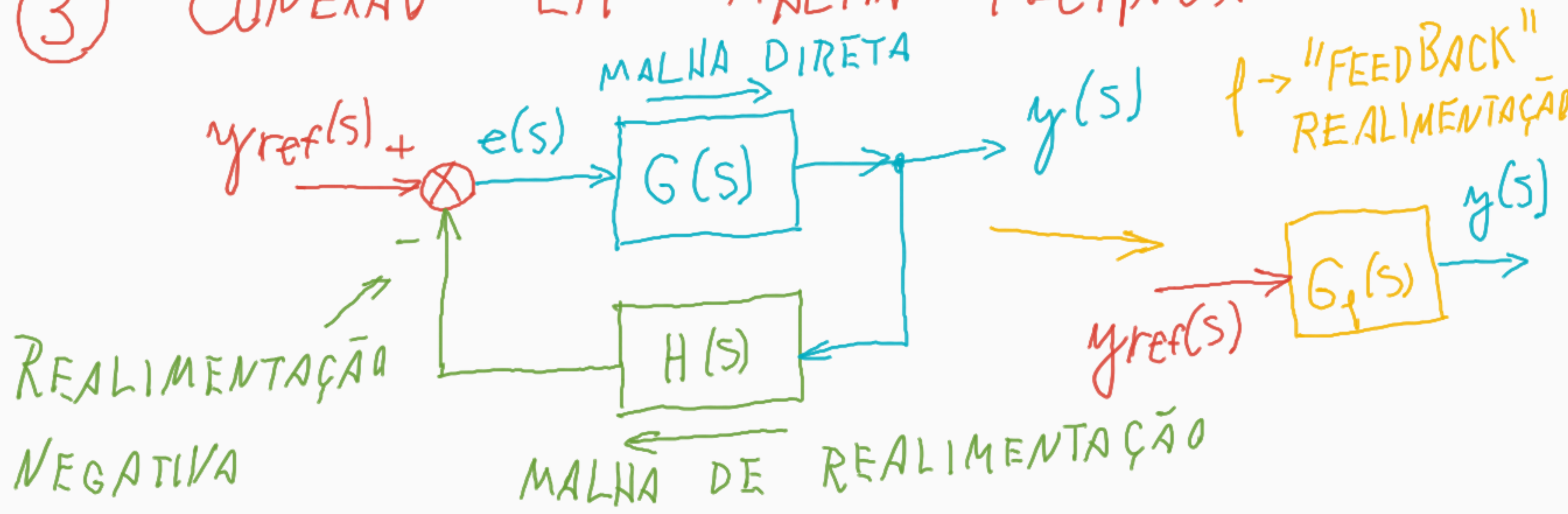
CONEXÃO PARALELA



$$y(s) = G_1 u + G_2 u + \dots + G_n u = [G_1(s) + G_2(s) + \dots + G_n(s)] u(s)$$



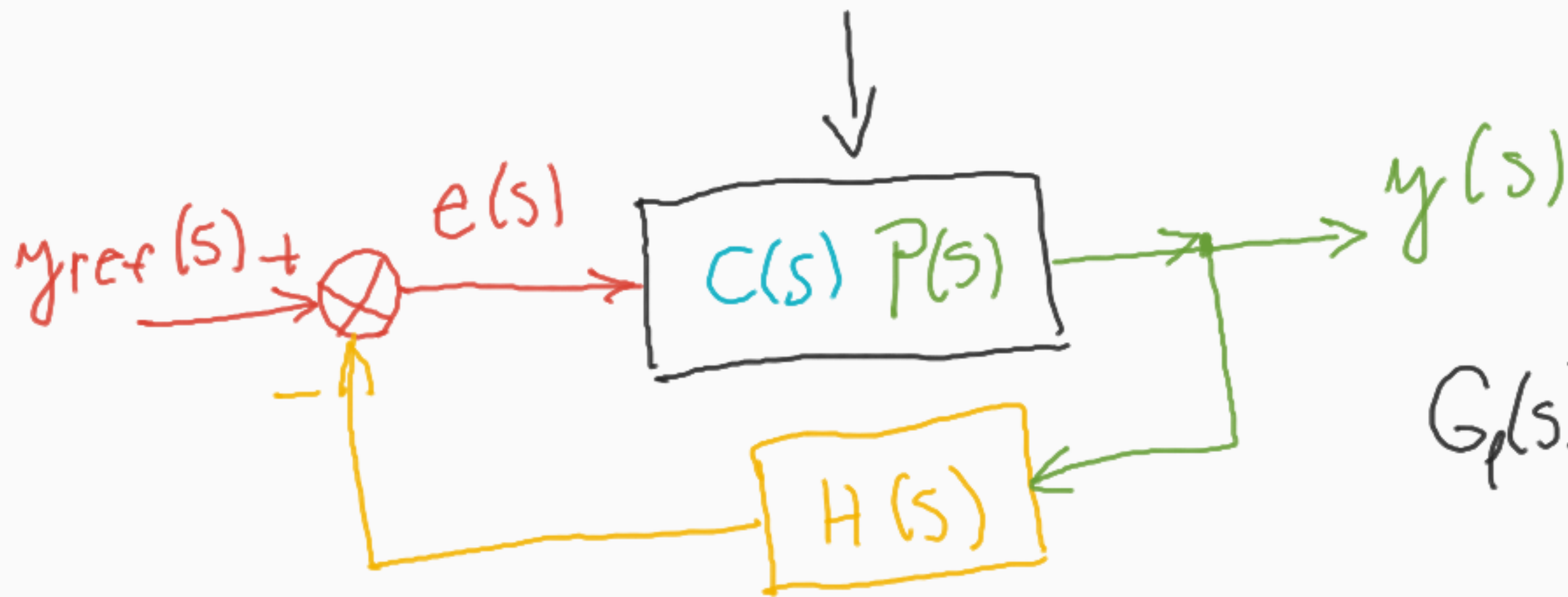
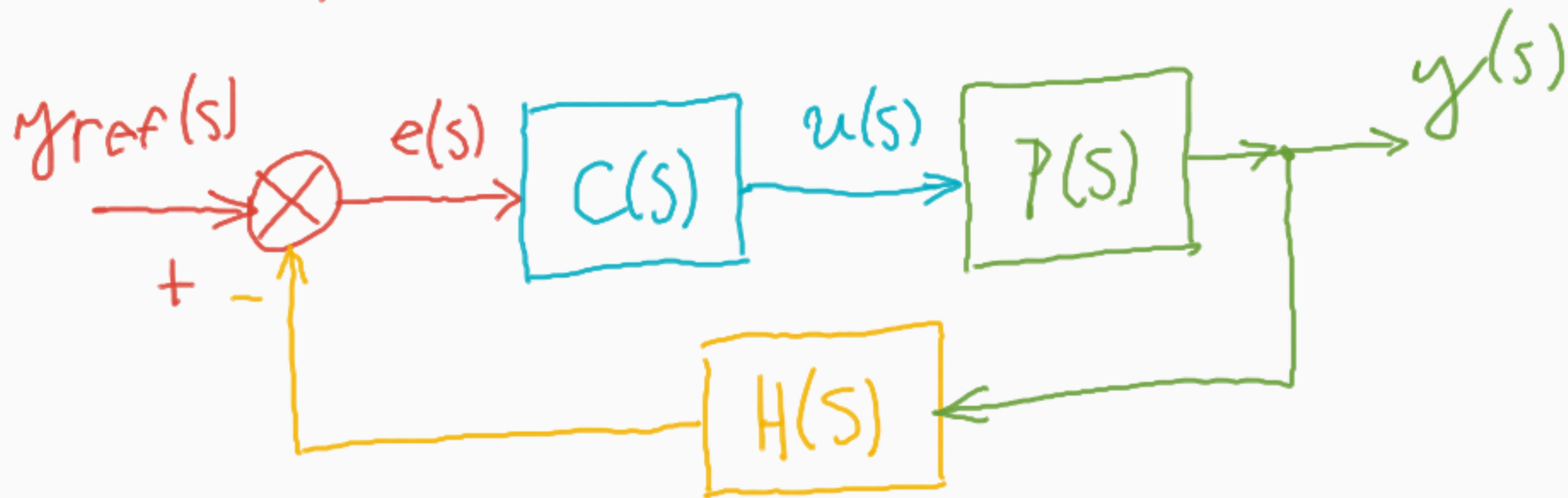
③ CONEXÃO EM MALHA FECHADA



$$y = Ge = G [y_{ref} - Hy] \Rightarrow y + GHy = G y_{ref} \Rightarrow$$

$$\Rightarrow [1 + GH] y = G y_{ref} \Rightarrow G_c(s) := \frac{y(s)}{y_{ref}(s)} = \frac{G(s)}{1 + G(s)H(s)}$$

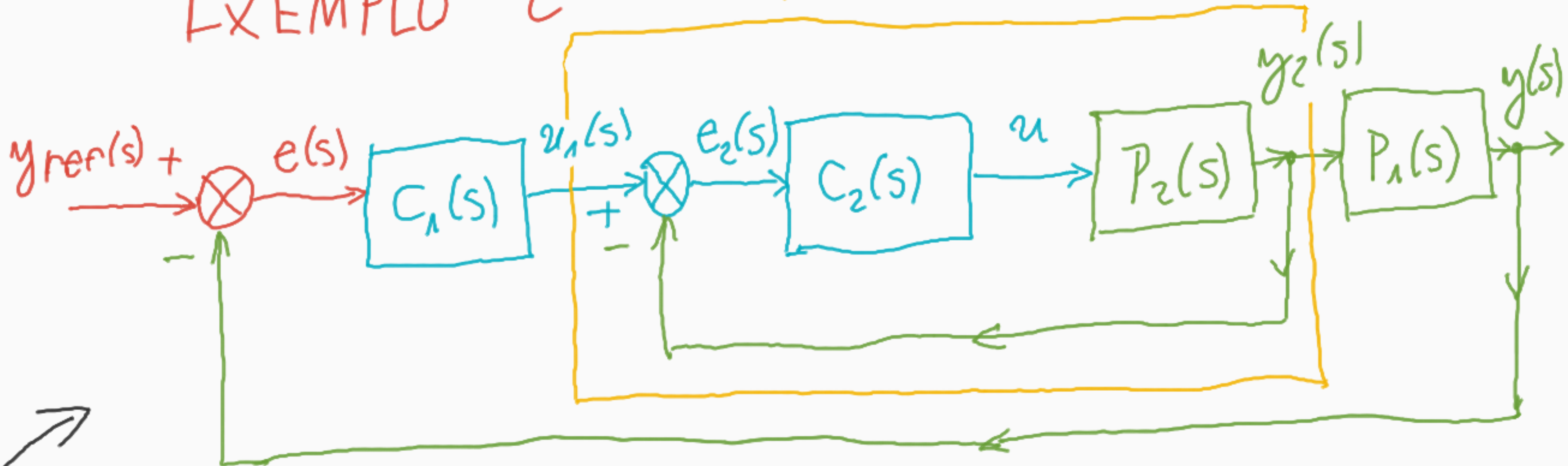
EXEMPLO 1



$$G_p(s) := \frac{y(s)}{y_{ref}(s)} = \frac{C(s)P(s)}{1 + C(s)P(s)H(s)}$$

EXEMPLO 2

MALHA INTERNA



MALHA INTERNA, MALHA SECUNDÁRIA, MALHA ESCRAVA

MALHA EXTERNA, MALHA PRIMÁRIA, MALHA MESTRA

$$G_{p2}(s) := \frac{y_2(s)}{u_1(s)} = \frac{C_2(s)P_2(s)}{1 + C_2(s)P_2(s)}$$



$$G_f(s) := \frac{y(s)}{y_{ref}(s)} = \frac{C_1(s)G_{p2}(s)P_1(s)}{1 + C_1(s)G_{p2}(s)P_1(s)}$$