Electronics II

Stability

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UAlg UNIVERSIDADE DO ALGARVE 30 anos 1979 | 2009

MIEET 3º ano

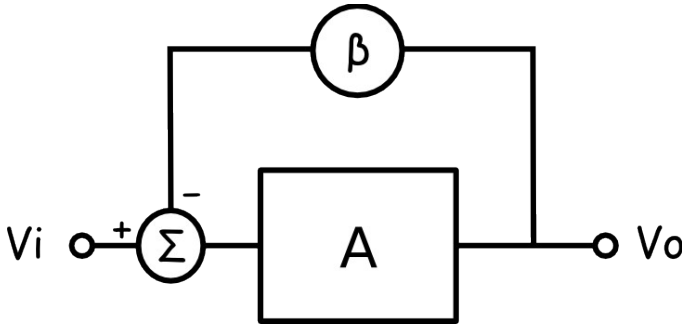

Figure 1: *System with **negative** feedback.* A *is the open-loop gain (without feedback), β is the feedback factor.*

a) Determine the relation between input signal and output signal, $A_f \equiv V_o/V_i$.

The ideal amplifier ($r_{in} = \infty$, e $r_{out} = 0$) has an open-loop gain of 10^5 and has poles at 10 Hz, 1 kHz, 100 kHz and 1 MHz.

The feedback is made of resistances (passive elements that do not change the phase) and is given as β = 0.5.

b) Determine the DC gain.

Determine if the amplifier with feedback is stable (Phase margin: 45º). For this

c) Make *Bode plots* and *Nyquist plots* and draw conclusions. For what range of frequencies does the system run the risk of oscillating?

d) For what value of β the system is marginally stable?

e) Repeat paragraphs a) .. d) for the same system, but with **positive** feedback (see figure below).

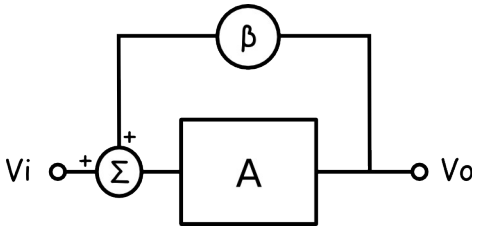

Figure 2: *System with **positive** feedback.*