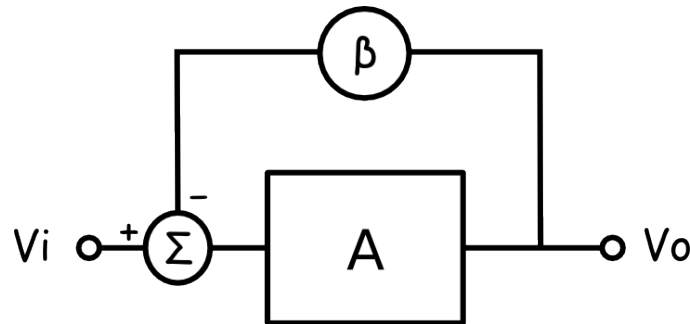


Electronics II  
2009-2010 mod. 1  
Problem sheet 6  
P. Stallinga



**Figure 1:** System with **negative** feedback.  $A$  is the open-loop gain (without feedback),  $\beta$  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  $\beta = 0.5$ .

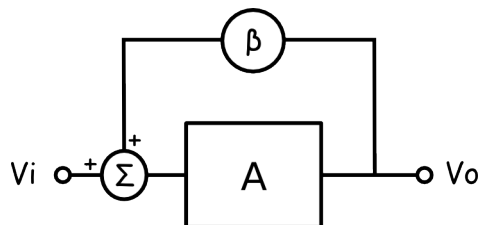
b) Determine the DC gain.

Determine if the amplifier with feedback is stable (Phase margin:  $45^\circ$ ). 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  $\beta$  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.