1. Determine the polarity of the feedback circuits shown below.
2. Compute the closed loop gain of the circuit shown below. Assume opamps have finite gain of $A_1$, $A_2$, but are otherwise ideal.
3. In problem 2, assume opamp A1 has a transfer function $H_{oc}(s) = \frac{A1}{1+s/\omega_p}$, determine the closed loop -3dB bandwidth.
4. The BJT source follower has the approximate transfer characteristic as shown in figure 4(a). Consider this follower to be driven by a differential amplifier with a gain of 100 as shown in figure 4(b). Explain the transfer characteristics $V_o$ vs. $V_i$ of the resulting feedback amplifier.
5. A realistic amplifier can be modeled by the following non-linear transfer function. For this amplifier, the open-loop gain changes from 1000 to 100 for output voltage larger than 1 V. Find the feedback factor ($\beta$) to be used in the closed loop amplifier shown below such that, the closed loop gain varies only by 10%, when the output voltage is above and below 1V. What is the transfer characteristic of the resulting closed-loop feedback amplifier?