Common-Source Amplifier Analysis Report

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DC analysis

V_G (V)	V_D (V)	V_S (V)	I_G (mA)	I_D (mA)	I_S (mA)
7.285	5.497	9.857	0.001	0.548	0.549

Table 1: DC analysis raw experimental data

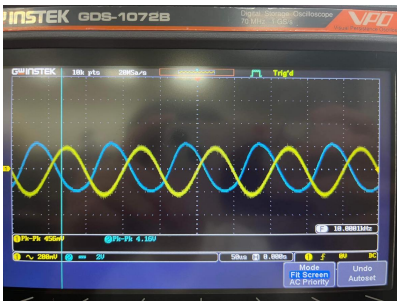
Small-signal analysis

Frequency of input waveform $f = 10$ kHz

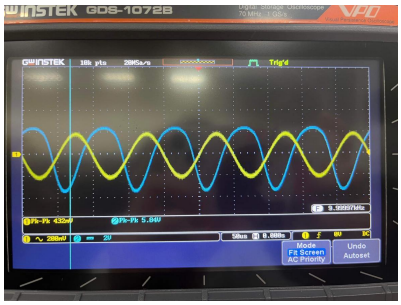
	CH1 (V)	CH2 (V)	CH2 / CH1
$\lvert v_o/v_{sig}\rvert$ with C_s	0.456	4.16	9.12
$\lvert v_o/v_i\rvert$ with C_s	0.432	5.84	13.5
$\lvert v_o/v_{sig}\rvert$ without C_s	0.448	0.220	0.491
$\lvert v_o/v_i\rvert$ without C_s	0.456	0.268	0.588

Table 2: Small-signal analysis raw experimental data

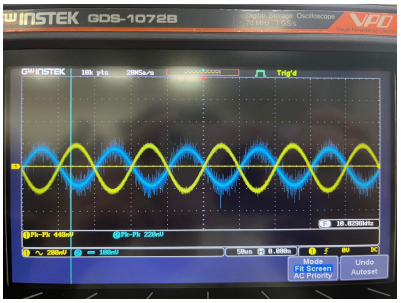
waveforms



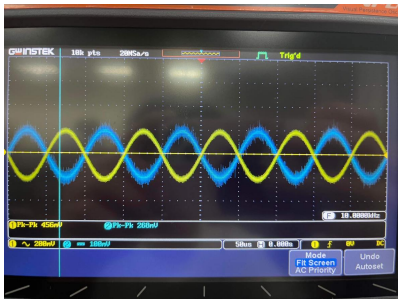
(a) $\lvert v_o/v_{sig}\rvert$ with C_s



(b) $\lvert v_o/v_i\rvert$ with C_s



(c) $\lvert v_o/v_{sig}\rvert$ without C_s



(d) $\lvert v_o/v_i\rvert$ without C_s

Conclusion: The gain without bypass capacitor (degenerate) is much lower than the one with bypass capacitor, which is concurrent with theoretical expectation.