Chapter Text

Inside back cover: Triode region equation should not be squared! \[ i_D = K_n \left( v_{GS} - V_{TN} - \frac{V_{DS}}{2} \right) v_{DS} \]

Page 49, first exercise, second answer: \(-1.35 \times 10^6\) cm/s

Page 58, last exercise, last answer: \(0.46 \Omega \cdot \text{cm} \rightarrow 2.16 \Omega \cdot \text{cm}\)

Page 80, second exercise: \(798 \text{ kV/cm}, 5.16 \times 10^{-4} \mu\text{m}, 0.0258 \mu\text{m}\).

Page 83, exercise: \(25.8 \text{ mV} \rightarrow 25.9 \text{ mV}\)

Page 89, exercise: ... from Eq. (2.1).

Page 172, exercise: (b) \(3 \times 10^{-15}\) A (c) 3 μA

Page 185: The fifth exercise: \((99.5 \mu\text{A}, 5.94 \text{ V})\).

Page 198, both exercises: ... of BETA, VTO and LAMBDA for ...

Page 200: Fourth exercise: \((1.25 \text{ mA}, 7.00 \text{ V})\)

Page 202: (b) part of fifth exercise: 0.680 V, -2.22 V, (1.54 mA, 7.36 V);

Page 238, exercise: ... 5.5 if resistor R is changed ...

Page 242, exercise: ... 5.22 if resistor R is changed ...

Page 256, exercise: \(1.39 \text{ fA}\)

Page 295, Table 6.2: The inverter definition should be \(Z = \overline{A}\) and the column data 1 0 1 0

Page 314, bottom: NM\text{H} calculation error: \(0.33 \rightarrow 0.43\)

Page 324, Table 6.6, Saturated Load \(\text{NM}_{\text{H}} 0.33 \rightarrow 0.43\)

Page 327, Fig. 6.32(a): Gate voltage error \(5 \text{ V} \rightarrow 2.5 \text{ V two times}\)

Page 837: Under CAD: Q-point: \((257 \mu\text{A}, 4.54 \text{ V})\)

Page 343, exercise: \(2.20 \text{ ns} \rightarrow 2.19 \text{ ns}\)

Page 344: The second equation on the \(\tau_{\text{PLH}}\) line should be \(t_i = \ldots\)
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Page 347, exercise: Assume a pseudo NMOS gate. Answer: 1.62 ps

Page 349, exercise: 189/1 → 190/1

Page 400, last exercise: … versus 594 times.

Page 426, exercise: W/L = 5 V → WL = 5 V
Page 428, exercise: W/L = 5 V → WL = 5 V

Page 431, first exercise, second answer: 1.34 ns

Page 483, third exercise: -0.1 V, -0.8 V, -1.5 V, -2.8 V; Last exercise: -0.2 V, -0.9 V, -1.6 V, -2.8 V

Page 501, exercise: 9.22 mA → 9.16 mA

Page 541, exercise: the last answer should just be 262 Ω

Page 546, Eq. 10.26: \[ A = \frac{10 - 0}{1.5 - 0.5} = +10 \]

Page 555, last paragraph: VCVC should be VCVS and VS should be VI two times.

Page 557, Fig. 10.21: I_应该 be i_i

Page 577, last exercise: Remove the comma in 50,100. It must be 50100

Page 581, Eq. 10.97: \[ A_v(s) = \frac{Z_2}{Z_1} = -\frac{R_s}{R_i} \frac{1}{sCR_i + 1} = -\frac{R_s}{R_i} \frac{s}{s + \omega_L} = \frac{A_o}{1 + \frac{\omega_L}{s}} \]

Page 582: Fig. 10.34 (a) \( v_o(t) = v_i(0) - \frac{1}{RC} \int_0^t v_i(\tau) d\tau \)

Page 605, first exercise: \( v_s \rightarrow v_i \); second exercise, last two answers: -9.89 V, -98.9 µV

Page 609, third exercise: 44.1, 36.3, 4.20 (10.5%), -3.70 (-9.3%)

Page 613 exercise: 100 µA → 99.5 µA

Page 622: 10.1; 24.5 MΩ; 1.57 Ω

Page 626, Ex. 11.6: Problem statement: Find T and ...

Page 628: The second exercise should refer to Ex. 11.6.
Answers: 2140, -91.0 kΩ, 9.21 Ω, 0.646 Ω
Page 632: Missing minus sign in equation for $v_{th}$: $\ldots = -9090v_{id}$

Page 6.34, above Eq. (11.71) … independent source $i_i$ must be …

Page 637 exercise: …for the shunt-series feedback …

Page 638 exercise: …for the shunt-series feedback …

Page 639, Eq. 11.86: $i_z = \frac{v_x - (-AV_x)}{R_B} = v_x \frac{1 + A}{R_B}$

Page 640, near bottom of page: $R_A = 10k\Omega\left\| (R_{id} + R_f) \right\| = \ldots$

Page 652 equation for $V_{CM}$: $V_{CM} = \ldots = 5.0$ V; 4.5 $\rightarrow$ 5.0 in next line of text, and the CMRR calculation needs to be corrected: $CMRR \geq 3.65 \times 10^4$

Page 658, above last figure:P (assuming $I_\v = 0 = 1$)

Page 672, Eqn. (11.149): $T(s) = \frac{A_0\omega_n}{s + \omega_n} \beta = \frac{T_0\omega_n}{s + \omega_n}$

Page 673, Eqn. (11.152): $T(0) = T_0 = A_0\beta$

Page 675 (iii) Under damped $\zeta < 1$ (…)

Page 677, second exercise: 2.69 MHz $\rightarrow$ 428 kHz

Page 705, second exercise, last answer: 3450 Hz

Page 711, Section 12.2, first paragraph: The reference to Fig. 12.3 should be Fig. 10.25.

Page 719, first exercise: $\frac{K}{3-K} \angle 90^\circ$

Page 724, in Ex. 12.7: $R_i = \frac{R_2}{|A_0(j\omega_n)|}$

Page 727, third exercise: $\ldots, S_C^Q$ and $S_C^{BW}$ for the $\ldots$; the sixth answer is $+\frac{1}{2}$

Page 728 exercise: 0.707 $\rightarrow$ 0.471 two times.

Page 731 last paragraph: $v_S \rightarrow v_I$
Page 732 exercise: 16.0 → -8.0

Page 738 exercise answers: 26 kΩ; 511 kΩ

Page 740 exercise answers: 511 pF; 31 pF; 6200 μm²

Page 758: The exercise should refer to Fig. 12.50.
Answers: 15.9 kHz; 3.00 V
SPICE Answers: 15.90 kHz, 3.33 V

Page 760 exercise: $v_s$ should be $v_i$ twice

Page 762 exercise: $v_s$ should be $v_i$ twice

Page 791 exercise: (1.45 mA, 3.57 V); 2.89 V

Page 814: First exercise: … was only -159.
Answer: -176; Approximately 10 percent of the input signal …
Second exercise: (a) -162; (b) -143, -175; (c) 2.34 V, -177

Page 821 exercise: 0.24 V → 0.253 V

Page 822, Table 13.3: JFET transconductance eqn.: $\frac{2I_D}{V_{GS} - V_P} = \frac{2}{V_P}|\sqrt{I_D I_{DSS}}$

Page 827: Known Information: Q-point is (0.241 mA, 3.81 V)

Page 832 - End of first: “at coupling capacitor $C_2$.”

Page 840, first exercise: 0.833 mW, 3.26 mW;

Page 860 exercise answers: 3.64 V → 3.39 V; 219 kΩ → 218 kΩ; 2150 → 2140

Page 875, second exercise: What are the values of $R_{sc}$ and $R_{out}$ …
Answers: 5.17 MΩ < 6.28 MΩ; 21.9 kΩ << 6.28 MΩ

Page 877: … in Ex. 14.1 … Answers: -16.0, 12 kΩ; Second exercise 0.425 fA

Page 884, last two exercises: -16.0, -6.02, 12 kΩ, 11 kΩ; -1.36, -1.29, -1.38, -1.50

Page 885 exercises: 0.430 fA
-176, -6.00; -9.05, -9.00; 5.72 < 6.00; 4.50 < 9.00

Page 889 exercise: 0.592 V, 1.27 V

Page 896, Eq. 14.80: The numerator should be $g_m R_L$ not $g_m R_i$
Page 911, first exercise: \( r = 0 \) should be \( \eta = 0 \)

Page 914, first exercise: \( \ldots \) one in Fig. P14.1(g).

Page 917: Last equation at the bottom - 210 k\( \Omega \) should be 21.5 k\( \Omega \).

Page 929, second exercise: 69.1 \( \Omega \), 3.38 V

Page 933 exercises: 75.1 \( \Omega \), +50.1; 2.29 V, 0.500 V; 332 \( \mu A \), 5.52 V, 20.5 k\( \Omega \), 8.06 k\( \Omega \)

Page 993, first exercise: 15.01 \( \rightarrow \) 15.0; 1.90\( \times 10^{15} \) \( \rightarrow \) 1.87\( \times 10^{15} \)

Page 1005, second exercise: 160/1

Page 1022, Fig. 15.50: \( R_E \) and \( R_S \) should be 18.4 k\( \Omega \); Second exercise: 10.9 M\( \Omega \)

Page 1077 last exercise: \( A_{E4} = 5.58 \)

Page 1081 exercise: 3.17 k\( \Omega \) \( \rightarrow \) 3.30 k\( \Omega \)

Page 1109 first exercise: \( Q_{16} \) should be \( Q_{15} \); 3.94 M\( \Omega \) \( \rightarrow \) 4.06 M\( \Omega \); 51 \( \Omega \) + 27 \( \Omega \) = 78 \( \Omega \)

Page 1139 first exercise: \( \ldots \) \( C_3 \) is reduced \( \ldots \); third exercise: \( R_S \) should be \( R_D \) and the answers should be 96.2 rad/s, 31.5 Hz.

Page 1158 exercise: -141 \( \rightarrow \) -139

Page 1169: DAC and ADC labels need to be interchanged.

Page 1184: In Eq. 17.153: \( r_{\pi} \rightarrow r_{\pi 0} \)

Page 1193, second exercise: 23.9 \( \Omega \) << 1.01 M\( \Omega \); 5.08 m\( \Omega \) << 66.7 \( \Omega \); 239 m\( \Omega \) << 2.69 k\( \Omega \)

Page 1239 exercise: 85.6 \( \Omega \) \( \rightarrow \) 86.8 \( \Omega \)

Page 1240 under Analysis: 20 mA \( \rightarrow \) 2.0 mA

Page 1241 exercise Q-points: \( (0.5 \ mA, 4.82 \ V) \), \( (0.5 \ mA, 6.32 \ V) \), \( (0.51 \ mA, 3.37 \ V) \), \( (2 \ mA, 5.0 \ V) \)

Page 1246, second exercise: \( A_{u} = -48.5 \) k\( \Omega \)

Page 1247: Equations at bottom of page: 

\[
\begin{align*}
R_{in} &= \left( R_F + \frac{1}{g_{m3}} \right) \left( \frac{1}{1 + T} \right) \\
R_{out} &= \frac{1}{g_{m3}} \left( \frac{1}{1 + T} \right)
\end{align*}
\]
Page 1251 exercise answers: 500 Ω, -204, -306, 334 Ω

Page 1251: Remove notation MbreakN from Fig. 18.11(b)

Page 1265: The equation reference immediately above Eq. (18.25) should be to Eq. (18.24).

Eqn. (18.25) should be:  
\[ \omega_z = \frac{1}{\left( \frac{1}{g_{m5}} - R_z \right) C_c} \]

Page 1273 exercise: 15.9 MHz, 69.5°
Problem Statements

Prob. 4.163  Use $V = 6 \, \text{V}$.

Fig. P6.31: 1 ns $\rightarrow$ 0.8 ns

P6.111:  Should refer to Fig. 6.29(e).

P7.57: "period of 50 ns."

P7.58: "period of 150 ns."

P7.66 parts (a), (b), (c), (d) "fixed at 0 \, \text{V}"  (four times)

P7.95 "What are the worst-case values"

P8.3 "(a)" is missing at the beginning of the problem, and part (a) should end in "and the voltage is 3.3 \, \text{V}.")

P8.12 End of first sentence "1-T memory cell?"

P8.15 remove "in the array"

Fig. P8.41: The black dot and first line segment on the upper left connecting W0 and B0 should be removed.

P9.59 and P9.60: Use $\alpha_F = 0.98$ and $\alpha_R = 0.2$

P9.119 and P9.120: Add "Use $-V_{EE} = -3 \, \text{V}$"

P10.25 $R_S \rightarrow R_I \times 2$

Fig. P10.44 Capital O subscript in $i_O$ and $v_O$

Fig P10.57 $i_{TH}$ and $R_{TH}$ should be $i_N$ and $R_N$

P10.58 $i_{TH}$ and $R_{TH}$ should be $i_N$ and $R_N$

Fig. P10.68(b) The resistor on the right should be 560 $\Omega$

P10.113 and P10.114 should refer to Fig. 10.35 and subscripts should be lower case: $V_S$ should be $V_i$; $V_O(s)/V_S(s)$ should be $V_o(s)/V_i(s)$

Figs. P10.119 and P10.120: $v_S$ should be $v_I$.

P11.55: $R_I = 2 \, \text{k}\Omega$ and $R_2 = 20 \, \text{k}\Omega$. 
P11.126 Change the open-loop gain to 94 dB and unity-gain frequency to 2.5 MHz

P13.18 Should refer to Fig. P13.3

Prob. 13.34 Assume $V_{SS} = 0$. Fig. P13.13: Transistor should be a depletion-mode transistor

Prob. 13.40(b) should refer to Fig. P13.11.

Prob. 13.42(b) should refer to Fig. P13.12.

Prob. 13.46 should refer to Fig. P13.7. (Space missing after problem.)

Prob. 13.65 $R_s$ should be $R_t$

Prob. 13.80 Remove "(a)"

Fig. P14.5 Labels $R_C$ and $R_E$ need to be interchanged.

Prob. 14.5 … construct a common-collector amplifier.

Prob. 14.6 … construct a common-emitter amplifier

Prob. 14.26 $V_{TN}$ should be $V_P$; $R_G = 10 \, \text{M}\Omega$, $R_3 = 36 \, \text{k}\Omega$

Prob. 14.62 The lower resistor ($R_E$) in Fig. P14.62 should be 6.2 $\text{k}\Omega$ instead of 2 $\text{k}\Omega$.

Prob. 14.65 Remove "(a)"

Prob. 14.83 $K_n = 400\mu\text{A}/\text{V}^2$

Prob. 14.86 $R_E$ should be $R_G$. Add $R_1 = 10 \, \text{k}\Omega$. $I_{DSO}$ should be $I_{DSS}$

Prob. 14.96 $C_1$ and $C_2$ (remove reference to $C_3$).

Prob. 14.98 Remove "(a)"

Prob. 14.99 Remove "(c)" and change text to "Check your design with SPICE."

Prob. 15.4 Change: $R_{EE} = 100 \, \text{k}\Omega$

Prob. 15.5 Change: $R_C = 240 \, \text{k}\Omega$

Prob. 15.9 Change: $I_{EE} = 300 \, \mu\text{A}$

Prob. 15.12 Change: $V_{CC} = 15 \, \text{V}$, $V_{EE} = 15 \, \text{V}$
Prob. 15.40  (b) $v_s \rightarrow v_1$

Prob. 15.92  (c) should be (b)

Prob. 15.121  Use the device parameters from Prob. 15.122.

Prob. 15.123  Use the device parameters from Prob. 15.122.

Prob. 16.55  … if the body terminals of $M_3$ and $M_4$ are connected to…

Prob. 17.11  Reference to $C_2$ should be to $C_3$.

Prob. 17.97  $R_L$ should be $R$

Prob. 17.100  $R_L$ should be $R$

Prob. 17.106  … in Fig. 17.105(b) to give … in Fig. 17.105(a).

Prob. 17.114  Should refer to 1196; impedances $\rightarrow$ admittances

Prob. 17.115  Should refer to 1196; admittances $\rightarrow$ impedances

Prob. 18.22  … across $R_i$.

Prob. 18.23  Remove "(without $R_L$)". Add to end: "Use $\pm 10$-V power supplies."

Prob. 18.30  Change the second (c) to (d)

Prob. 18.37  Find the closed-loop transconductance, …

Prob. 18.40  Use $R_{L1} = R_{L2} = R_{L3} = 4 \, k\Omega$, $R_{E1} = R_{E2} = 1 \, k\Omega$, $R_F = 10 \, k\Omega$, and $R_i = 200 \, \Omega$.

Prob. 18.65  Change the word "improve" to "change"

Prob. 18.73  $M_5$ should be $Q_5$; "the base of $Q_6$" should be "the emitter of $Q_6$"; the problem statement should end with a period.

Prob. 18.80  Changes: $TF = 505$ ps and $CJC = 2.32$ pF.

Prob. 18.93  At the end: … $2.5 mA/V^2$?