$$Q_{C_1}^{\phi 2} + Q_{C_0}^{\phi 2} + Q_{C_{P1}}^{\phi 2} + \Delta I_{out} = Q_{C_1}^{\phi 1} + Q_{C_0}^{\phi 1} + Q_{C_{P1}}^{\phi 1}$$
$$V_{out}[n - \tfrac{1}{2}] \times (C_1 + C_{P1} + C_0) + (\tfrac{T_{clock}}{2}) \times I_{out} = Vin \times (C_1 + C_{P1}) + V_{out}[n-1] \times (C_0 - C_1) \tag{1}$$

$$-Q_{C_1}^{\phi 1} + Q_{C_0}^{\phi 1} + Q_{C_{P2}}^{\phi 1} + \Delta I_{out} = -Q_{C_1}^{\phi 2} + Q_{C_0}^{\phi 2}$$
$$-(Vin - V_{out}[n]) \times C_1 + V_{out}[n] \times (C_0 + C_{P2}) + (\tfrac{T_{clock}}{2}) \times I_{out} = V_{out}][n - \tfrac{1}{2}] \times (-C_1 + C_0) \tag{2}$$

$$V_{out} = \frac{\frac{1}{2}(C_1 + C_{_{out}} + C_{P1})(-I_{out}T_{clock} + 2C_1V_{in}) + (C_1 - C_{out})(\frac{I_{out}T_{clock}}{2} - (C_1 + C_{P1})V_{in})}{-(C_1 - C_{out})(C_1 - C_{out}) + (C_1 + C_{out} + C_{P1})(C_1 + C_{out} + C_{P2})} \tag{3}$$

$$V_{out} = \frac{-I_{out} \times T_{clock} + (2 \times C_1 + C_{P2}) \times V_{in}}{4C_1 + C_{P1} + C_{P2}} \tag{4}$$

$$F_{clock} = \frac{I_{out}}{2 \times C_1 \times V_{in} + C_{P2} \times (V_{in} - 2 \times V_{out}) - C_1 \times V_0 - 3 \times C_1 \times V_{out}} \tag{5}$$

$$\begin{gathered}(V_{in} - V_{out})C_1 + V_{in}C_{P1} = V_{out}(C_1 + C_{P1}) + \Delta Q_{out}^{\phi 2} \\ 0 = \Delta Q_{in}^{\phi 2} \\ -V_{out}C_1 = (V_{out} - V_{in})C_1 + V_{out}C_{P2} + \Delta Q_{out}^{\phi 1} \\ V_{out}(C_1 + C_{P1}) = (V_{in} - V_{out})C_1 + V_{in}C_{P1} + \Delta Q_{in}^{\phi 1}\end{gathered} \tag{6}$$

$$\begin{gathered}\Delta Q_{in}^{\phi 1} = -C_1V_{in} - C_{P1}V_{in} + 2C_1V_{out} + C_{P1}V_{out} \\ \Delta Q_{in}^{\phi 2} = 0 \\ Q_{out}^{\phi 1} = C_1V_{in} - 2C_1V_{out} - C_{P2}V_{out} \\ \Delta Q_{out}^{\phi 2} = C_1V_{in} + C_{P1}V_{in} - 2C_1V_{out} - C_{P1}V_{out}\end{gathered} \tag{7}$$

$$\eta = \frac{|P_{out}|}{|P_{in}|} = \frac{|V_{out} \times (C_1 V_{in} - 2C_1 V_{out} - C_{P2} V_{out} + C_1 V_{in} + C_{P1} V_{in} - 2C_1 V_{out} - C_{P1} V_{out})|}{|V_{in} \times (-C_1 V_{in} - C_{P1} V_{in} + 2C_1 V_{out} + C_{P1} V_{out} + 0)|} = \left| \frac{V_{out} \times (-(2C_1 + C_{P1}) V_{in} + V_{out}(4C_1 + C_{P1} + C_{P2}))}{V_{in} \times ((C_1 + C_{P1}) V_{in} - (2C_1 + C_{P1}) V_{out})} \right| \tag{8}$$

$$Q_{C1}^{\phi 2} + Q_{C2}^{\phi 2} + Q_{C0}^{\phi 2} + \Delta R = Q_{C1}^{\phi 1} + Q_{C2}^{\phi 1} + Q_{C0}^{\phi 1}$$

$$V_{out}[n - \tfrac{1}{2}](C_1 + C_2 + C_0 + \tfrac{T_{clock}}{2 \times R_L}) = (V_{in} - V_a)C_1 + (V_a - V_{out}[n-1])C_2 + V_{out}[n-1]C_0 \tag{9}$$

$$\begin{gathered} -Q_{C1}^{\phi 1} + Q_{C2}^{\phi 1} = -Q_{C1}^{\phi 2} + Q_{C2}^{\phi 2} \\ -(V_{in} - V_a)C_1 + (V_a - V_{out}[n])C_2 = V_{out}[n - \tfrac{1}{2}](-C_1 + C_2) \end{gathered} \tag{10}$$

$$\begin{gathered} -Q_{C2}^{\phi 1} + Q_{C0}^{\phi 1} + \Delta R = -Q_{C2}^{\phi 2} + Q_{C0}^{\phi 2} \\ -(V_a - V_{out}[n])C_2 + V_{out}[n] \times (C_0 + \tfrac{T_{clock}}{2 \times R_L}) = V_{out}[n - \tfrac{1}{2}](-C_2 + C_0) \end{gathered} \tag{11}$$

$$\frac{V_{out}}{V_{in}} = \frac{2 \times C_1 \times C_2 \times F_{clock} \times R_L \times (1 + 6 \times C_0 \times F_{clock} \times R_L)}{C_2 + 4C_2 C_0 F_{clock} R_L + C_1(1 + 4C_0 F_{clock} R_L + 2C_2 F_{clock} R_L(5 + 18 C_0 F_{clock} R_L))} \tag{12}$$

$$\frac{V_{out}}{V_{in}} = \frac{3 \times C_1 \times C_2 \times F_{clock} \times R_L}{C_1 + C_2 + 9 \times C_1 \times C_2 \times F_{clock} \times R_L} \tag{13}$$

$$F_{clock} = \frac{(C_1 + C_2)V_{out}}{3 \times C_1 \times C_2 \times R_L \times V_{in} - 9 \times C_1 \times C_2 \times R_L \times V_{out}} \tag{14}$$

$$F_{clock} = \frac{2 \times V_{out}}{3 \times C \times R_L \times V_{in} - 9 \times C \times R_L \times V_{out}} \tag{15}$$

$$
\begin{aligned}
(V_{in} - V_a) \times C_1 - (V_a - V_{out}) \times C_2 &= V_{out} \times (C_1 + C_2) + \Delta Q_{out}^{\phi 2} \\
-(V_{in} - V_a) \times C_1 + (V_a - V_{out}) \times C_2 &= V_{out} \times (C_2 - C_1) \\
\Delta Q_{in}^{\phi 2} &= 0 \\
-V_{out} \times C_2 &= (V_{out} - V_a) \times C_2 + \Delta_{out}^{\phi 1} \\
V_{out} \times C_1 &= (V_{in} - V_a) \times C_1 + \Delta_{out}^{\phi 1}
\end{aligned}
\tag{16}
$$

$$
\begin{aligned}
\Delta Q_{out}^{\phi 2} &= (V_{in} - 3 \times V_{out}) \times C \\
\Delta Q_{in}^{\phi 2} &= 0 \\
\Delta Q_{out}^{\phi 1} &= \tfrac{1}{2} \times (V_{in} - 3 \times V_{out}) \times C \\
\Delta Q_{in}^{\phi 1} &= -\tfrac{1}{2} \times (V_{in} - 3 \times V_{out}) \times C
\end{aligned}
\tag{17}
$$

$$
\eta = \frac{|P_{out}|}{|P_{in}|} = \frac{\left|V_{out} \times (\frac{1}{2} \times (V_{in} - 3 \times V_{out}) \times C + (V_{in} - 3 \times V_{out}) \times C)\right|}{\left|V_{in} \times (-\frac{1}{2} \times (V_{in} - 3 \times V_{out}) \times C + 0)\right|} = \left| -\frac{3 \times V_{out}}{V_{in}} \right| \tag{18}
$$

$$
\eta = \frac{3 \times V_{out}}{V_{in}} \tag{19}
$$