In[414]:=
```
(* Amplificador A *)
Solve[{
    I1 == (V - Vo)/(R0 + Rx),
    I2 == V/(2 R0),
    V - R0 * I1 == R0 * I2
  }, {I1, I2, Vo}] // FullSimplify
Vo /. %[[1]] /. {Rx → R0 (1 + α)} // FullSimplify
D[%, α]
```

Out[414]= $\left\{\left\{I1 \to \frac{V}{2\,R0},\ I2 \to \frac{V}{2\,R0},\ Vo \to \frac{(R0 - Rx)\,V}{2\,R0}\right\}\right\}$

Out[415]= $-\frac{V\,\alpha}{2}$

Out[416]= $-\frac{V}{2}$

In[417]:=
```
(* Amplificador B *)
Solve[{
    V1/R + (V1 - V2)/R0 + (V1 - V3)/Rx + (V1 - Vo)/(n R) == 0,
    -(V1 - V3)/Rx + (V3 - Vm)/R0 + I1 == 0,
    -(V3 - Vm)/R0 - (V2 - Vm)/R0 == 0,
    (V2 - Vm)/R0 - (V1 - V2)/R0 - I1 == 0,
    V3 == V2 + V
  } /. Vm → 0, {V1, V2, V3, I1, Vo}] // FullSimplify
Vo /. %[[1]] /. {Rx → R0 (1 + α)} // FullSimplify
D[%, α] // FullSimplify
```

Out[417]= $\left\{\left\{V1 \to \frac{(R0 - Rx)\,V}{2\,(R0 + Rx)},\ V2 \to -\frac{V}{2},\ V3 \to \frac{V}{2},\ I1 \to -\frac{(3\,R0 + Rx)\,V}{2\,R0\,(R0 + Rx)},\ Vo \to \frac{(1 + n)\,(R0 - Rx)\,V}{2\,(R0 + Rx)}\right\}\right\}$

Out[418]= $-\frac{(1 + n)\,V\,\alpha}{2\,(2 + \alpha)}$

Out[419]= $-\frac{(1 + n)\,V}{(2 + \alpha)^2}$

In[420]:=
```
(* Amplificador C *)
Solve[{
    V1/R + V1/Rx + I1 == 0,
    V2/R + V2/R0 - I1 == 0,
    -V1/Rx - V2/R0 - Vo/(n R0) == 0,
    V1 == V2 + V
  }, {V1, V2, I1, Vo}] // FullSimplify
Vo /. %[[1]] /. {Rx → R0 (1 + α)} // Simplify
D[%, α] // FullSimplify
```

Out[420]=
$$\left\{\left\{V1 \to \frac{(R+R0)\,Rx\,V}{2\,R0\,Rx + R\,(R0+Rx)},\ V2 \to -\frac{R0\,(R+Rx)\,V}{2\,R0\,Rx + R\,(R0+Rx)},\right.\right.$$
$$\left.\left.I1 \to -\frac{(R+R0)\,(R+Rx)\,V}{R\,(2\,R0\,Rx + R\,(R0+Rx))},\ Vo \to \frac{n\,R0\,(-R0+Rx)\,V}{2\,R0\,Rx + R\,(R0+Rx)}\right\}\right\}$$

Out[421]=
$$\frac{n\,R0\,V\,\alpha}{2\,R0\,(1+\alpha) + R\,(2+\alpha)}$$

Out[422]=
$$\frac{2\,n\,R0\,(R+R0)\,V}{(2\,R0\,(1+\alpha) + R\,(2+\alpha))^2}$$

In[423]:=
```
(* Amplificador D *)
Solve[{
    (* (V-V1)/R0 + (V-V1)/R0 == 0, *)
    V1/R0 + V1/(n R0) - (V - V1)/R0 == 0,
    V1/Rx + (V1 - Vo)/(n R0) - (V - V1)/R0 == 0
  }, {V1, Vo}] // FullSimplify
Vo /. %[[1]] /. {Rx → R0 (1 + α)} // Factor
D[%, α] // FullSimplify
```

Out[423]=
$$\left\{\left\{V1 \to \frac{n\,V}{1+2\,n},\ Vo \to \frac{n^2\,(R0-Rx)\,V}{Rx + 2\,n\,Rx}\right\}\right\}$$

Out[424]=
$$-\frac{n^2\,V\,\alpha}{(1+2\,n)\,(1+\alpha)}$$

Out[425]=
$$-\frac{n^2\,V}{(1+2\,n)\,(1+\alpha)^2}$$

In[426]:=
```
Export[NotebookFileName[EvaluationNotebook[]] <> ".pdf", EvaluationNotebook[]];
```