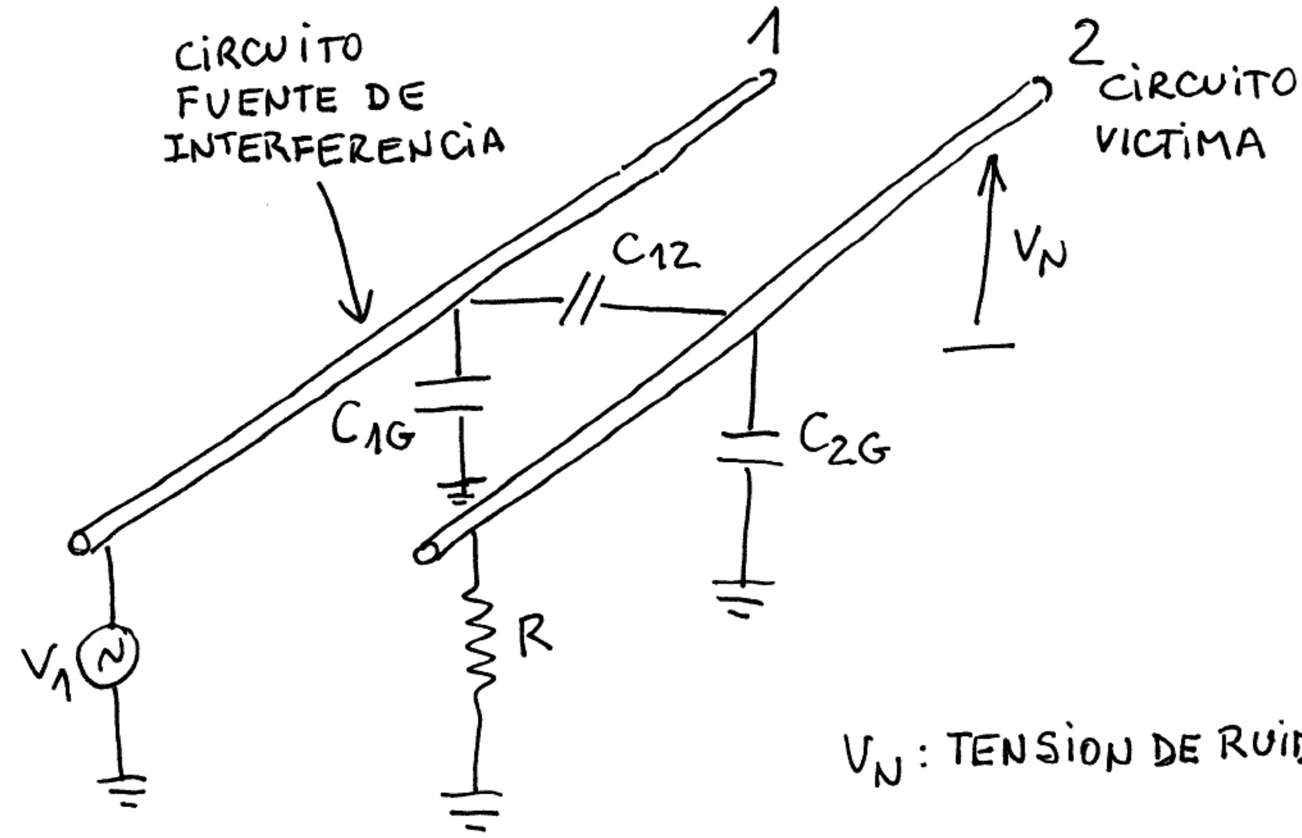
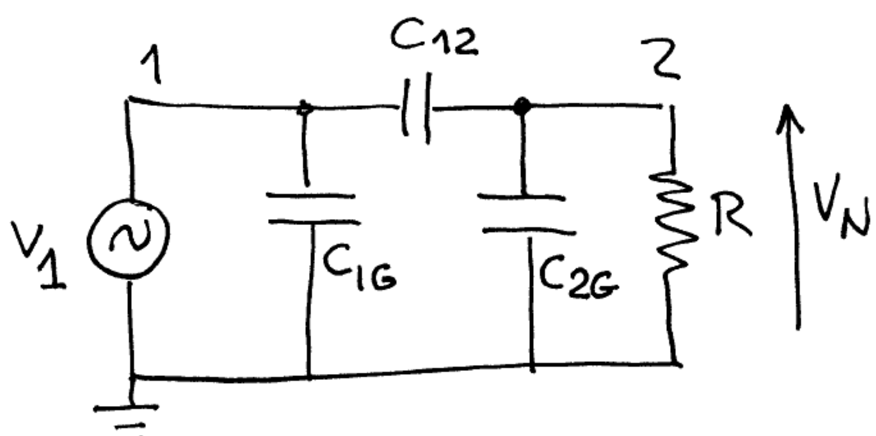
ACOPLAMIENTO CAPACITIVO



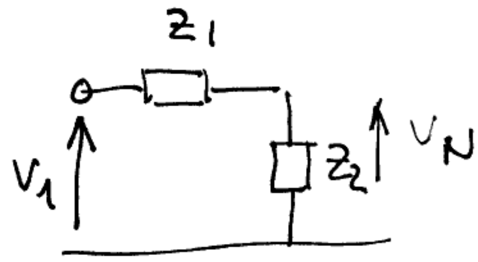
V_N : TENSION DE RUIDO



$$1 \Big/ \left[\frac{1}{j\omega C_{12}} + \left(\frac{1}{R} + j\omega C_{2G}\right)\right] + j\omega C_{1G} = Z_{tot}$$

$$\frac{1}{\dfrac{1 + \frac{1}{R} j\omega C_{12} + j\omega C_{2G}\, j\omega C_{12}}{j\omega C_{12}}} + j\omega C_{1G} = Z_{tot}$$

$$Y_2 = 1/R + j\omega C_{2G}$$



$$Z_2 = \frac{1}{\frac{1}{R} + j\omega C_{2G}}$$

$$Z_2 = \frac{R}{1 + j\omega C_{2G} R}$$

$$V_1 \cdot \frac{Z_2}{Z_2 + Z_1} = V_N$$

$$V_1 \cdot \frac{\dfrac{R}{1 + j\omega C_{2G} R}}{\dfrac{R}{1 + j\omega C_{2G} R} + \dfrac{1}{j\omega C_{12}}} = V_N \cdot$$

$$V_1 \cdot \frac{\dfrac{R}{\cancel{1 + j\omega C_{2G} R}}}{\dfrac{R\, j\omega C_{12} + (1 + j\omega C_{2G} R)}{\cancel{(1 + j\omega C_{2G} R)}\, j\omega C_{12}}} =$$

$$V_1 \cdot \frac{R\, j\omega C_{12}}{j\omega C_{12} R + (1 + j\omega C_{2G} R)} =$$

$$V_1 \cdot \frac{R\, j\omega C_{12}}{1 + j\omega R (C_{12} + C_{2G})} = V_N \cdot$$

Si $R \ll Z_2$

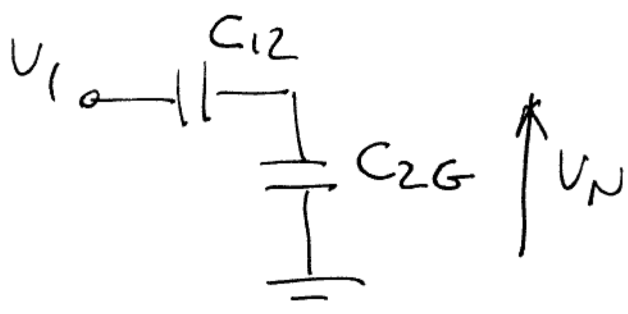
R ES DE BAJA IMPEDANCIA

$$V_1 \cdot \frac{R}{R + \frac{1}{j\omega C_{12}}}$$

$$V_1 \frac{R}{R+1/j\omega C_{12}} = V_1 \cdot \frac{R}{\dfrac{j\omega C_{12}R+1}{j\omega C_{12}}} = V_1 \frac{j\omega C_{12}R}{j\omega C_{12}R+1}$$

$$\boxed{V_N \cong V_1 \cdot j\omega C_{12} R}$$

Si $R \gg \omega C_{2G}$

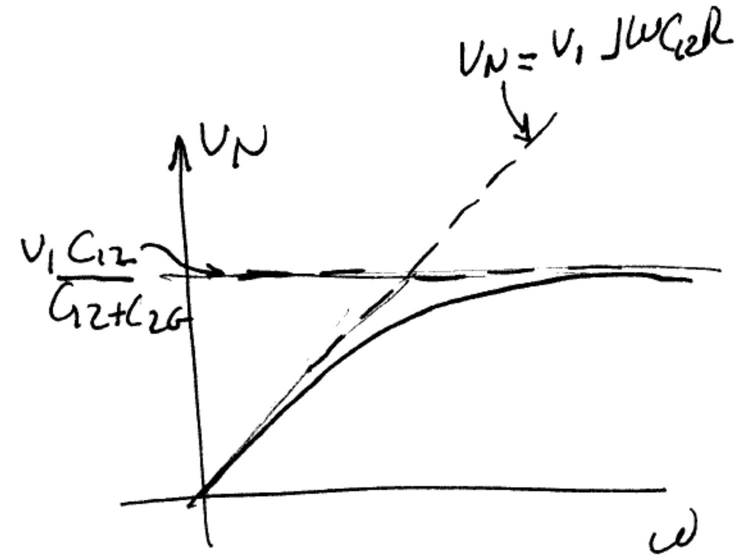


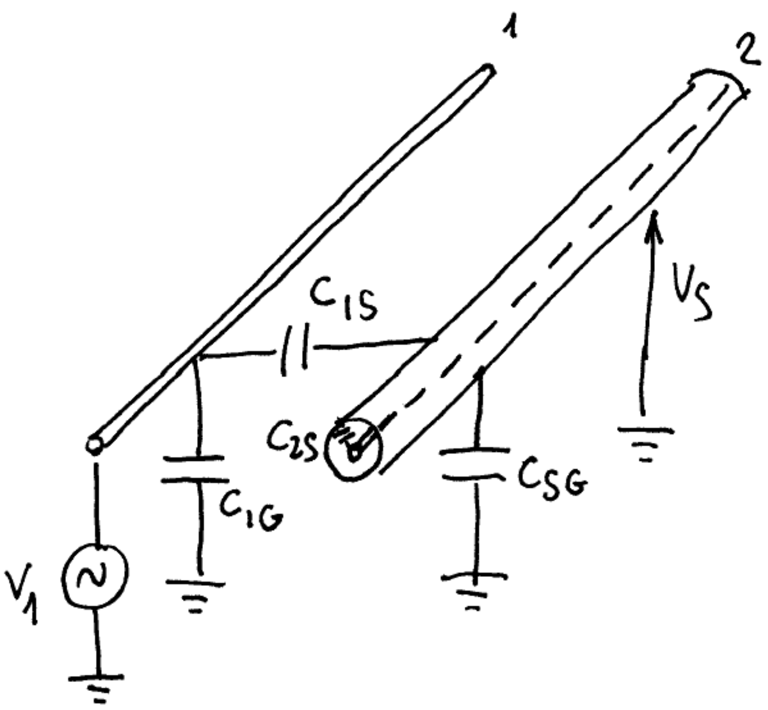
V_1

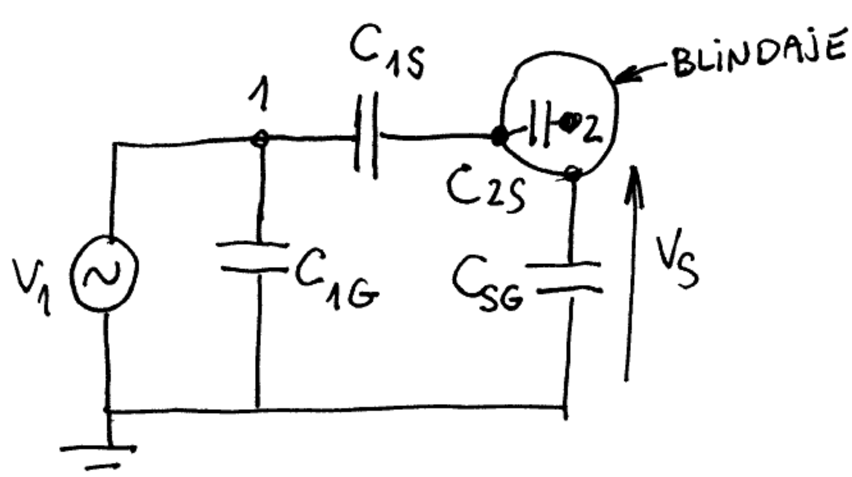
$$V_N = V_1 \cdot \frac{\dfrac{1}{\omega C_{2G}}}{\dfrac{1}{\omega C_{2G}} + \dfrac{1}{\omega C_{12}}} = V_1 \cdot \frac{\dfrac{1}{C_{2G}}}{\dfrac{1}{C_{2G}} + \dfrac{1}{C_{12}}}$$

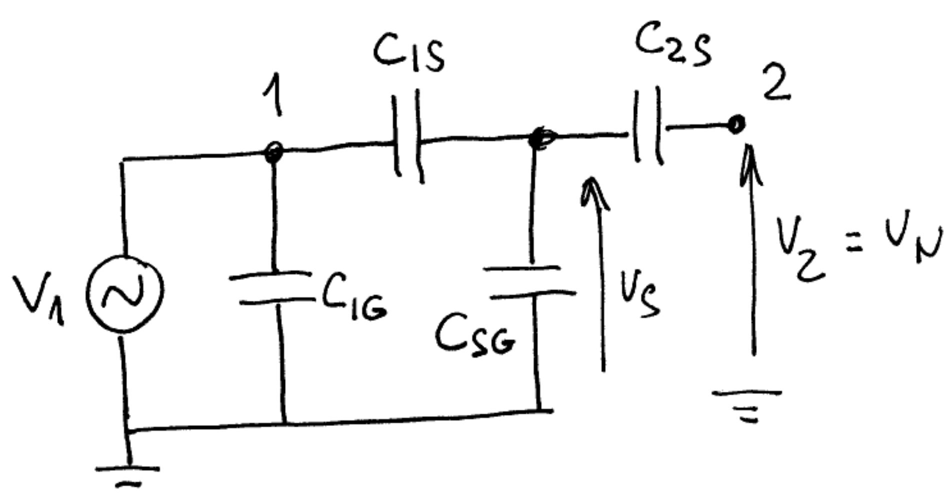
$$V_N = \frac{\cancel{\dfrac{1}{C_{2G}}}}{\dfrac{C_{12}+C_{2G}}{\cancel{C_{2G}}C_{12}}} V_1 = \frac{C_{12}}{C_{12}+C_{2G}} \cdot V_1$$

$$\boxed{V_N = V_1 \cdot \frac{C_{12}}{C_{12}+C_{2G}}}$$




1
2
V_S
C_{1S}
C_{2S}
C_{SG}
C_{1G}
V_1


C_{1S}
BLINDAJE
1
2
C_{2S}
V_1
C_{1G}
C_{SG}
V_S

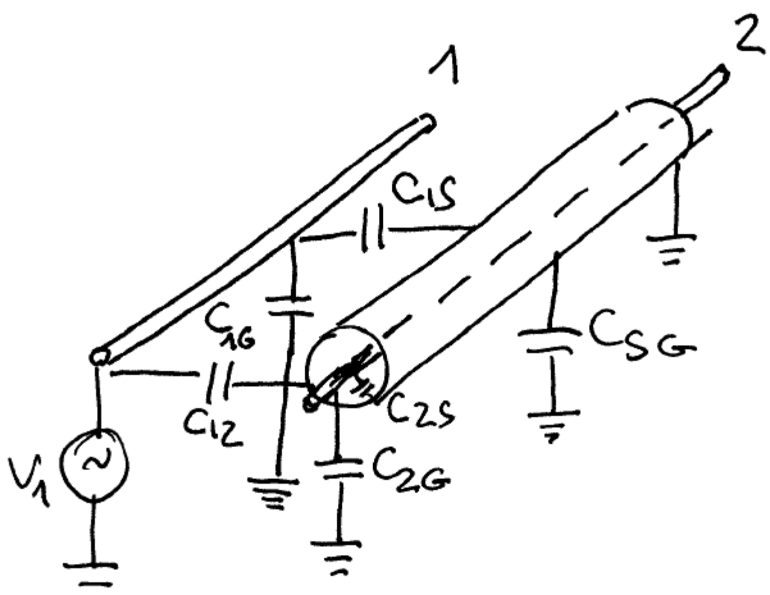

C_{1S}
C_{2S}
1
2
V_1
C_{1G}
C_{SG}
V_S
$V_2 = V_N$

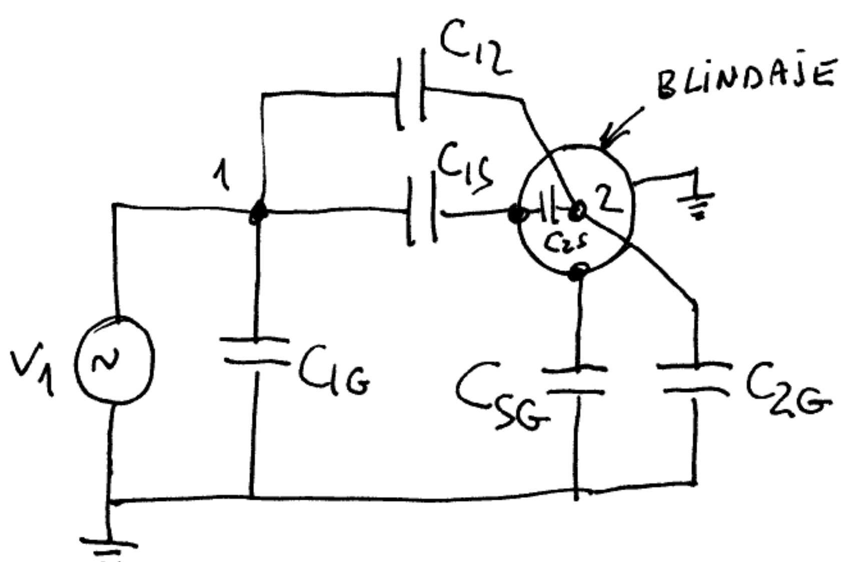
$$V_S = \frac{C_{1S}}{C_{1S} + C_{SG}} \cdot V_1$$

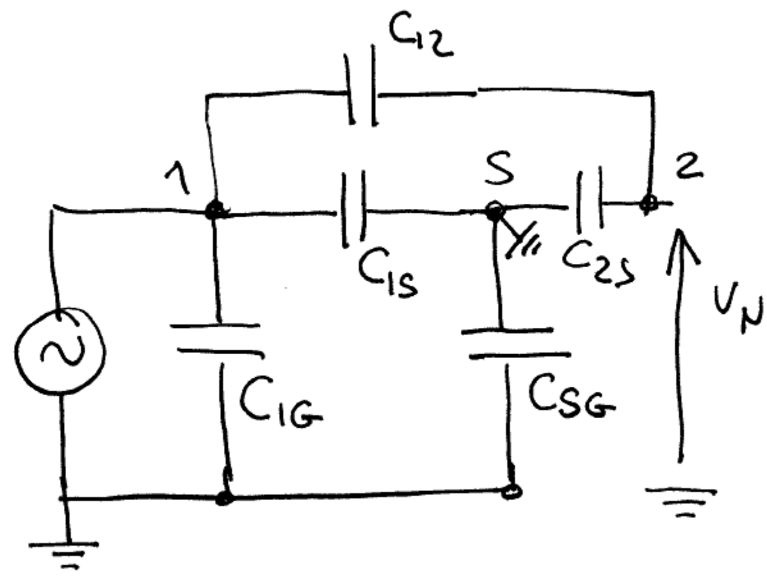
$$\boxed{V_N \equiv V_S}$$

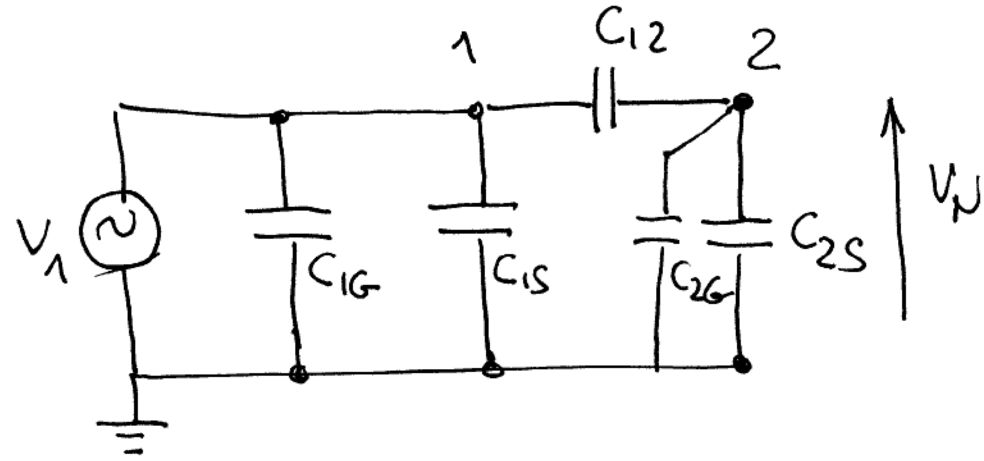
LA TENSION DE RUIDO NO SE REDUCE

SI EL BLINDAJE SE CONECTA A TIERRA $V_N = V_S = 0$.







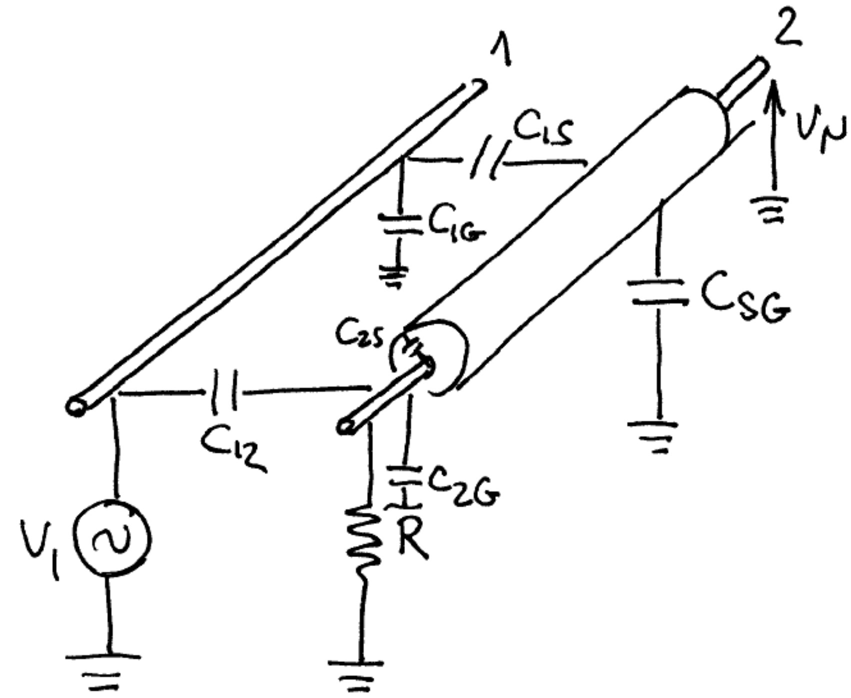


$$V_N = \frac{C_{12}}{C_{12} + C_{2G} + C_{2S}} \cdot V_1$$

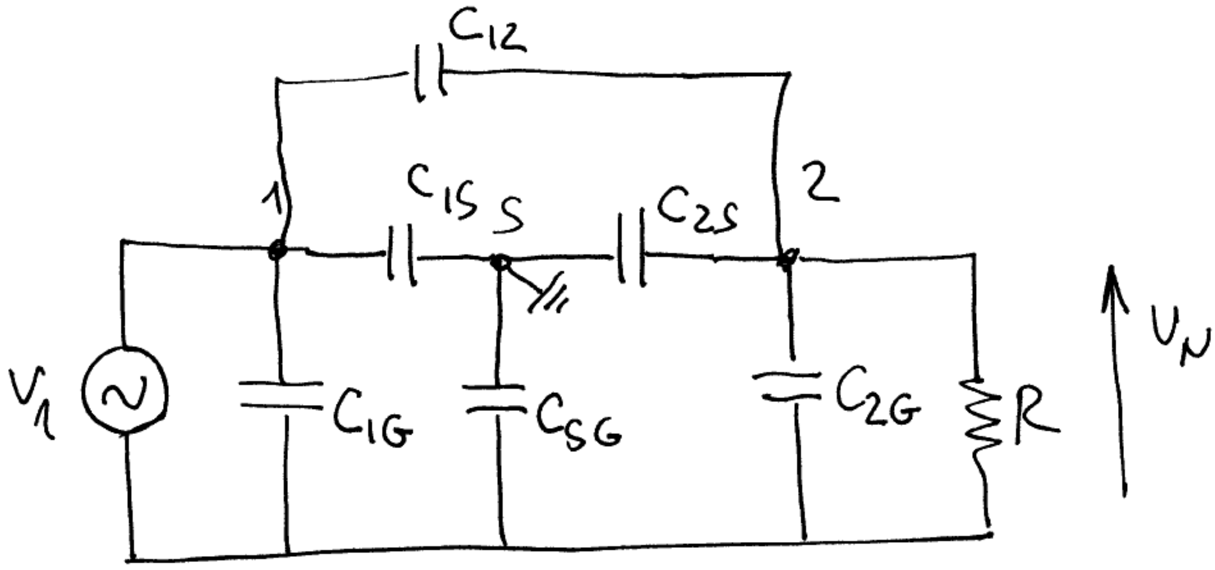
PARA BRINDAR EL CAMPO ELECTRICO.

1) BAJAR LONGITUD DE COND. 2 $\longrightarrow$ $C_{12} \downarrow$ $(1/20\lambda)$

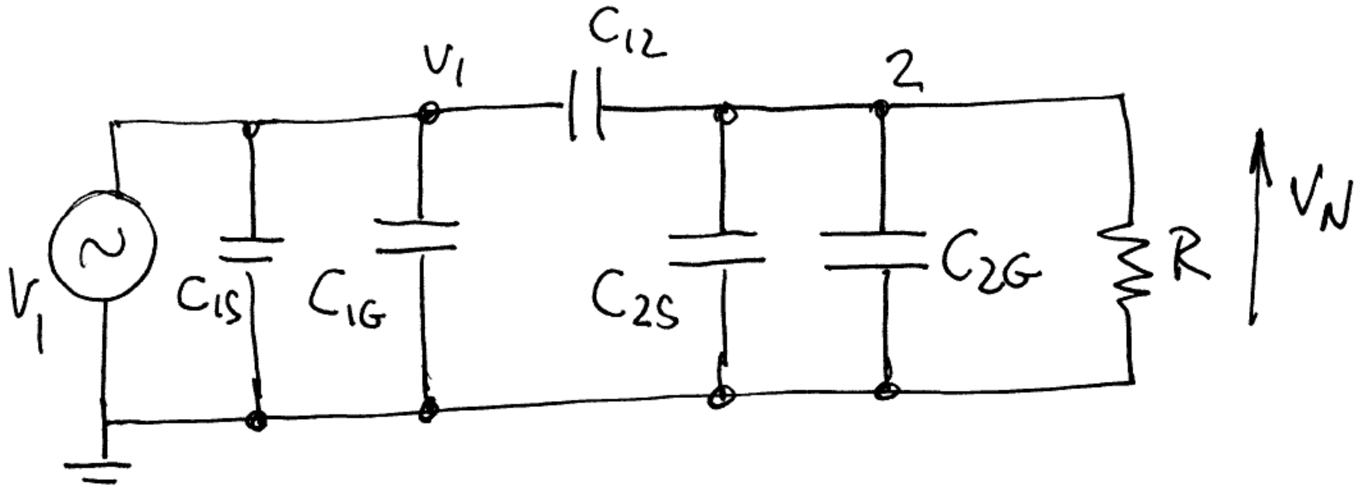
2) BUENA CONEXION A TIERRA EN EL BLINDAJE



1
2
C_{1S}
V_N
C_{1G}
C_{SG}
C_{2S}
C_{12}
C_{2G}
V_1
R



C_{12}
C_{1S}
S
C_{2S}
1
2
V_N
V_1
C_{1G}
C_{SG}
C_{2G}
R



C_{12}
V_1
2
V_N
V_1
C_{1S}
C_{1G}
C_{2S}
C_{2G}
R

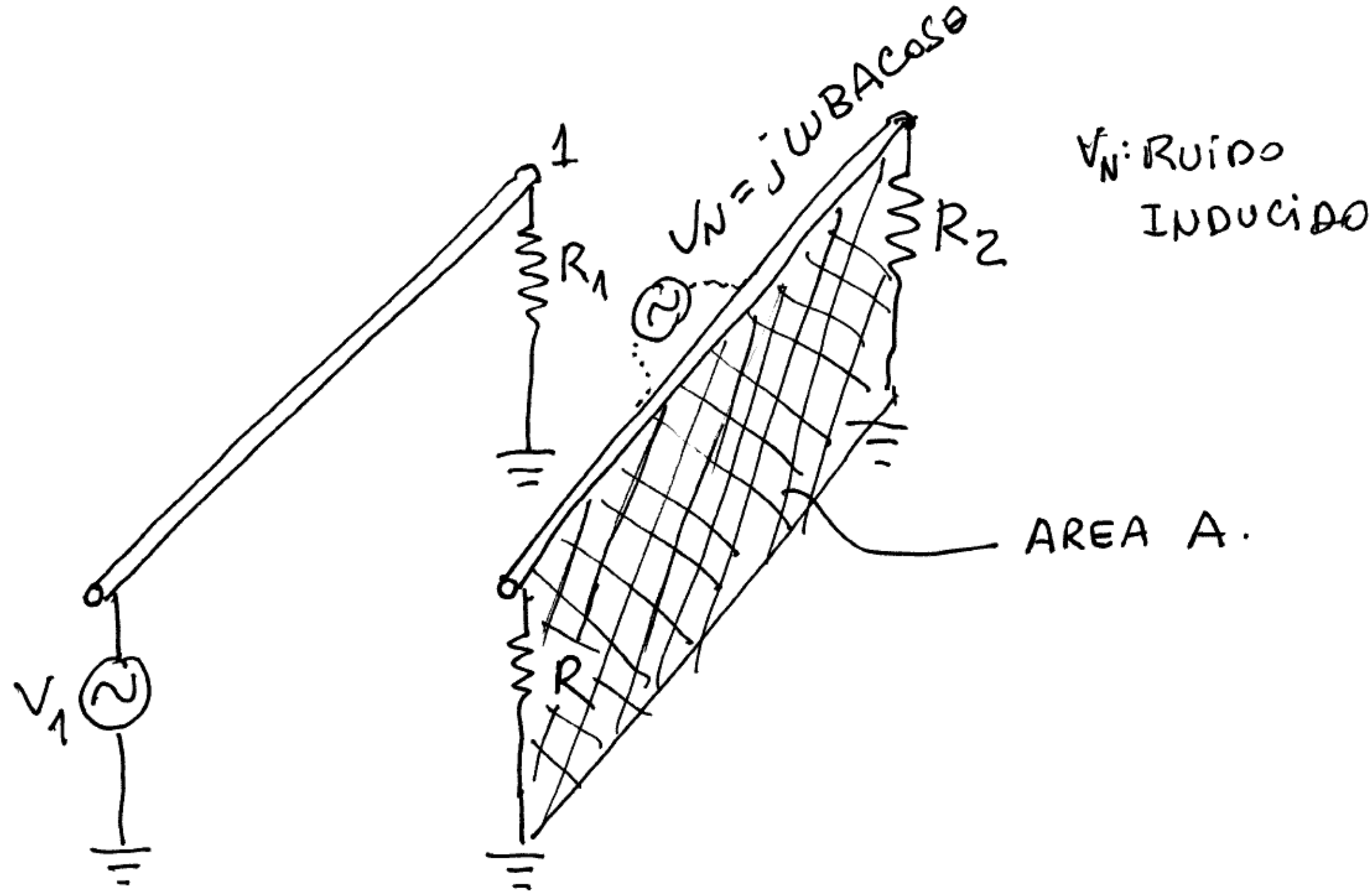
Si $R \ll \omega(C_{2G}+C_{2S})$ (CASO USUAL).

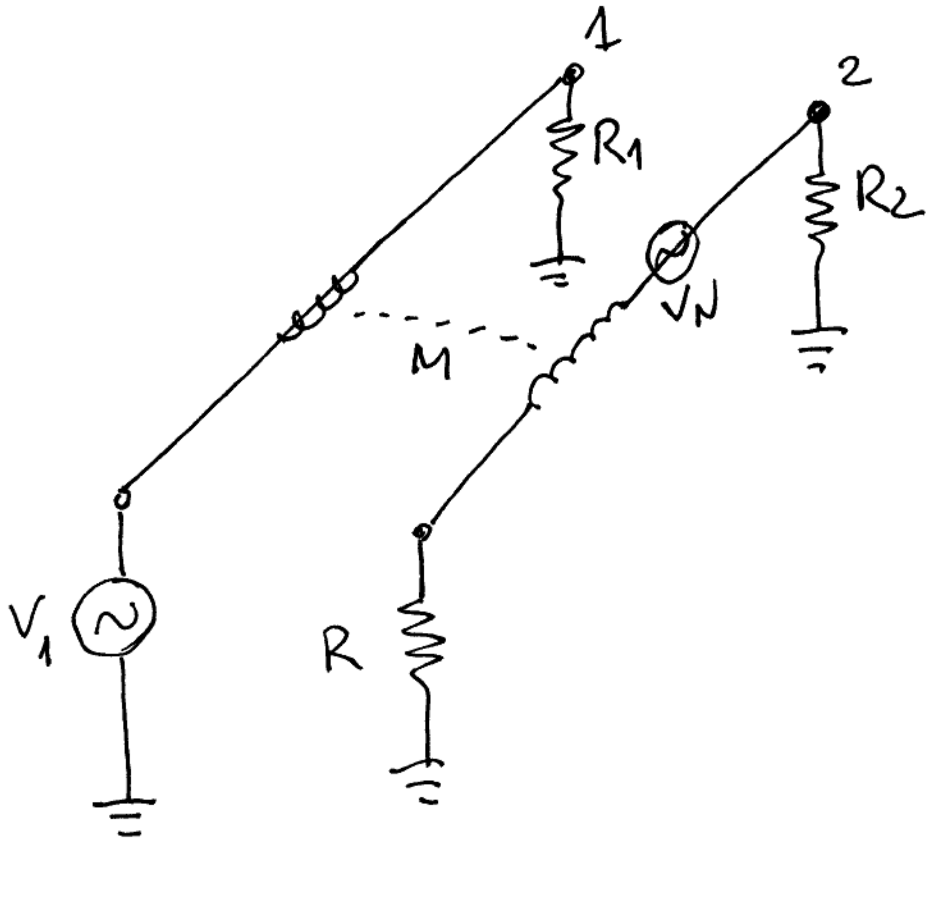
$$\boxed{V_N \cong j\omega R C_{12} V_1}$$

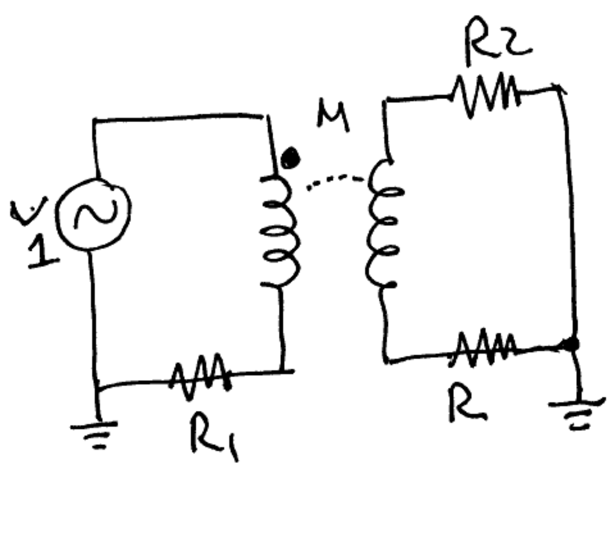
IGUAL AL CASO DE CABLE SIN BLINDAJE

AHORA $C_{12}\downarrow$ POR LA PRESENCIA DEL BLINDAJE.

ACOPLAMIENTO INDUCTIVO







$$M = \frac{\phi_{12}}{I_1}$$

$$V_N = -\frac{d}{dt}\int_A \vec{B}\cdot\vec{ds}$$

$$V_N = j\omega \underbrace{BA\cos\theta}_{M I_1}$$ (CAMPO SINUSOIDAL)

$$\boxed{V_N = j\omega M I_1}$$

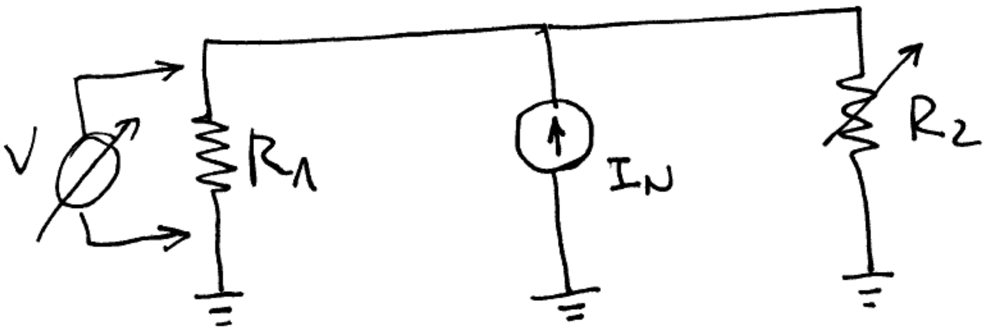
PARA DISMINUIR EL ACOPLAMIENTO INDUCTIVO

DISMINUIR B y A

CABLES TRENZADOS (TWISTED PAIRS).

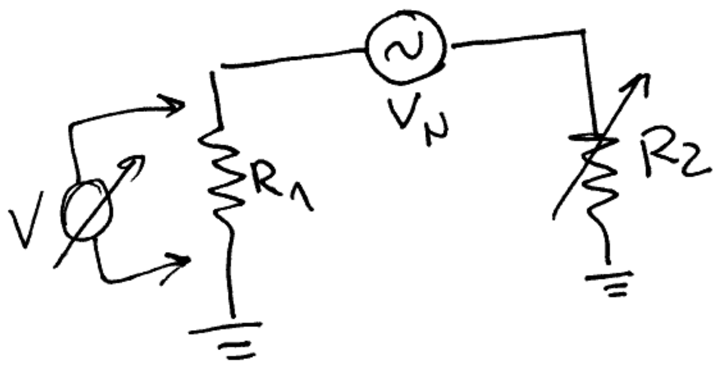
COLOCAR CONDUCTOR 2 CERCA "PLANO DE TIERRA"

ACOP. ELECTRICO



$$I_N = j\omega C_{12} V_1$$

ACOP. MAGNETICO.

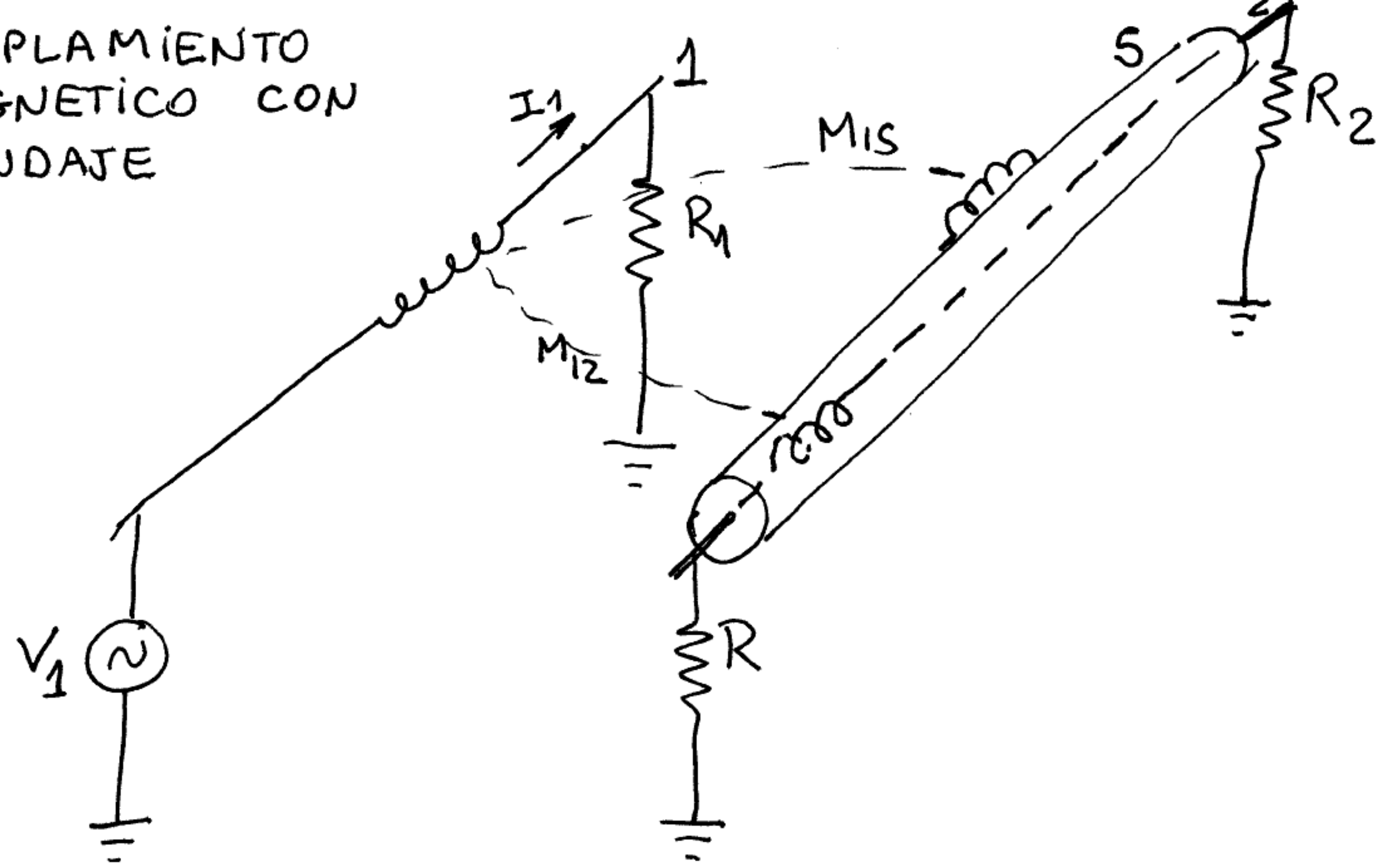


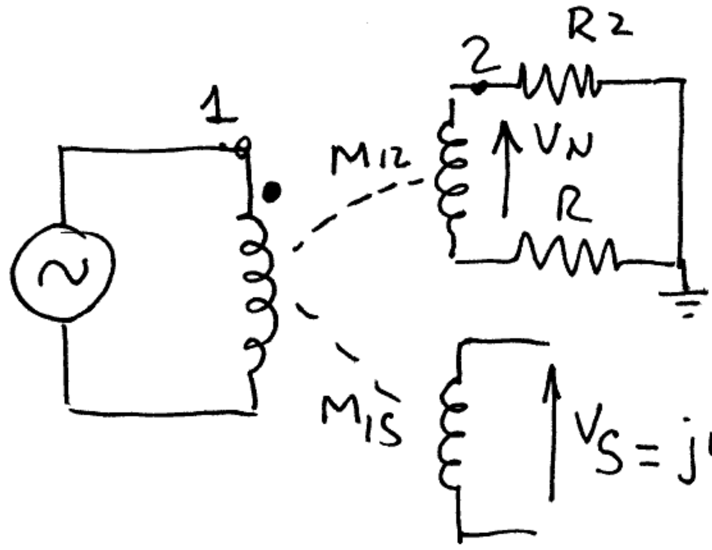
$$V_N = j\omega M_{12} I_1$$

Si $R_2 \downarrow \longrightarrow$ $V \downarrow$ ACOP. ELECTRICO

$V \uparrow$ ACOP. MAGNETICO

ACOPLAMIENTO MAGNETICO CON BLINDAJE

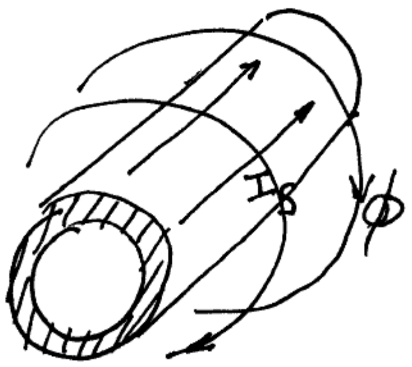




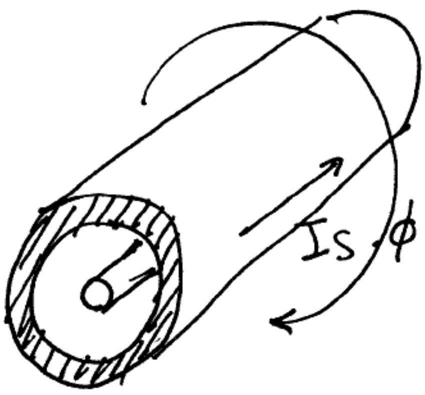
$V_N = j\omega M_{12} I_1$

$V_S = j\omega M_{1S} I_1$

ACOPLAMIENTO MAGNETICO
BLINDAJE-CONDUCTOR INTERNO



$$L_S = \frac{\phi}{I_S}$$



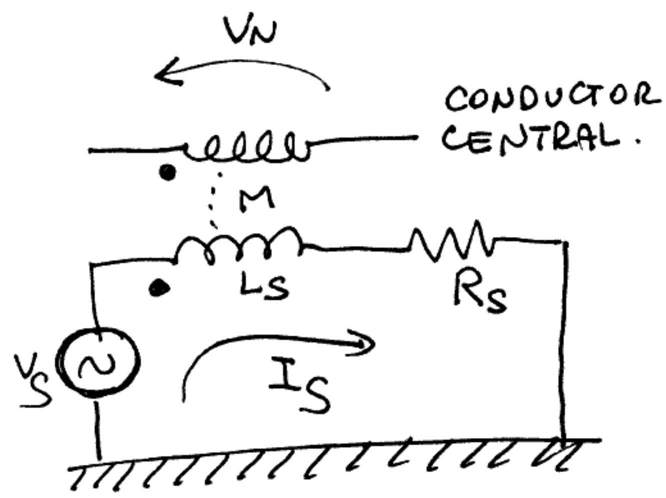
$$M = \frac{\phi}{I_S}$$

INDUCTANCIA MUTUA BLINDAJE - CONDUCTOR

MISMO FLUJO ϕ.

$$\boxed{L_S \equiv M}$$

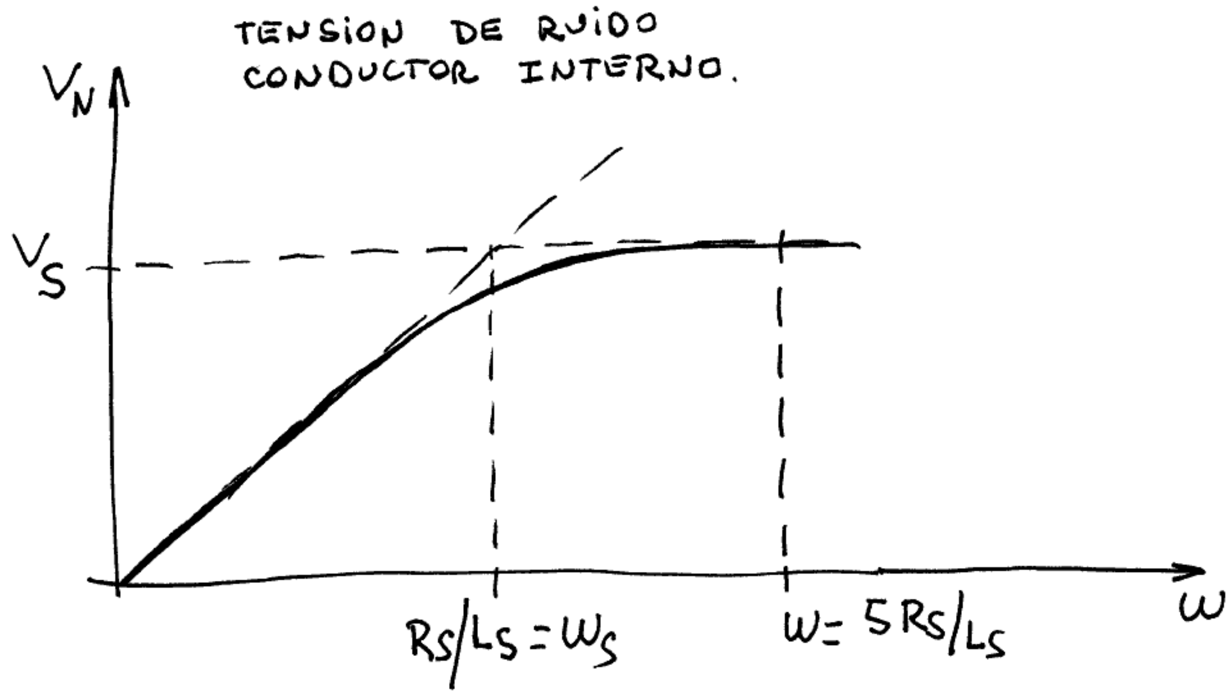
$$V_N = j\omega M I_S$$

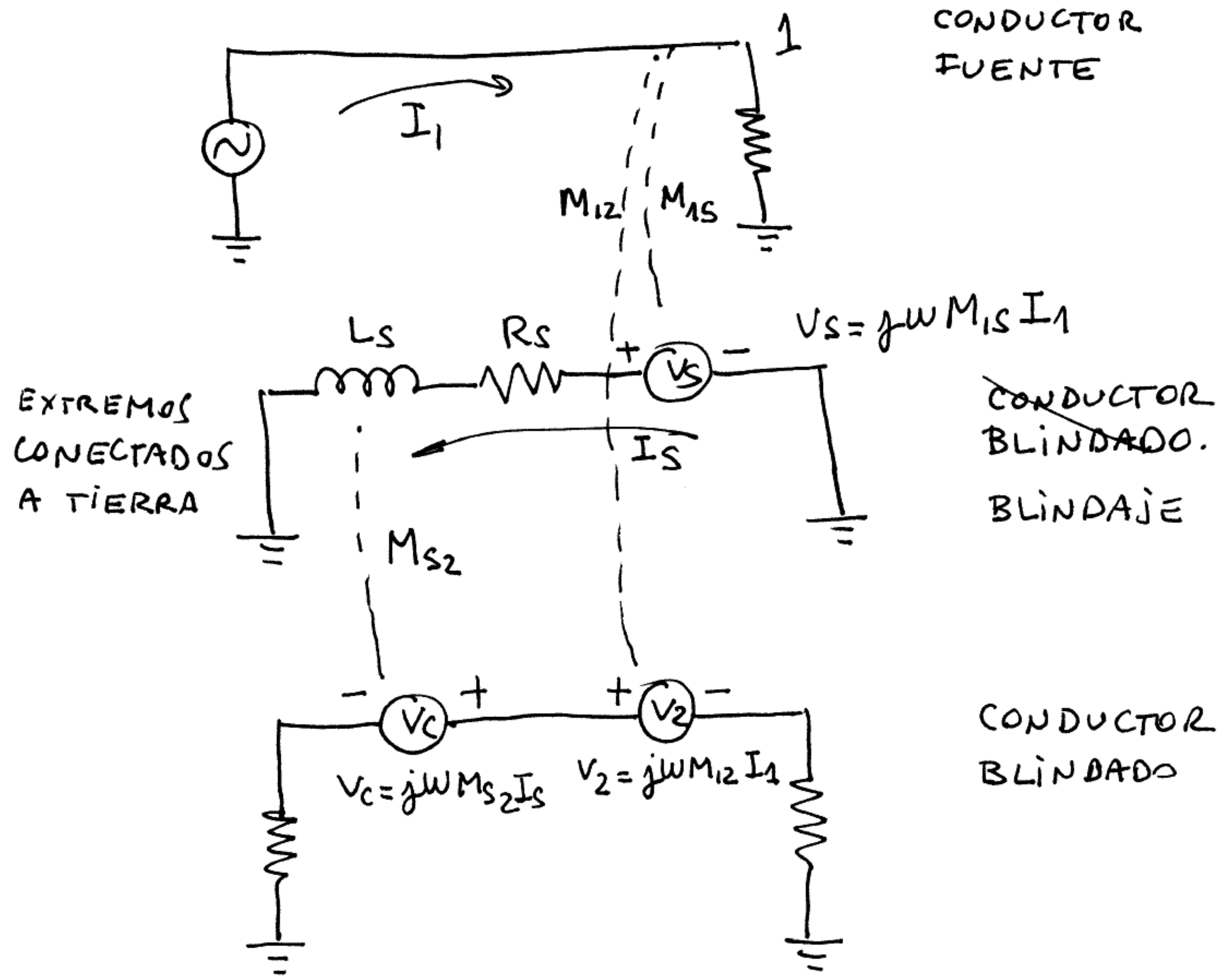


$$I_S = \frac{V_S}{R_S + j\omega L_S}$$

M = L_S

$$V_N = j\omega M. \frac{V_S}{R_S + j\omega L_S} = \left(\frac{j\omega}{j\omega + \frac{R_S}{L_S}} \right) V_S$$


TENSION DE RUIDO
CONDUCTOR INTERNO.
V_N
V_S
ω
$R_S/L_S = \omega_S$
$\omega = 5R_S/L_S$

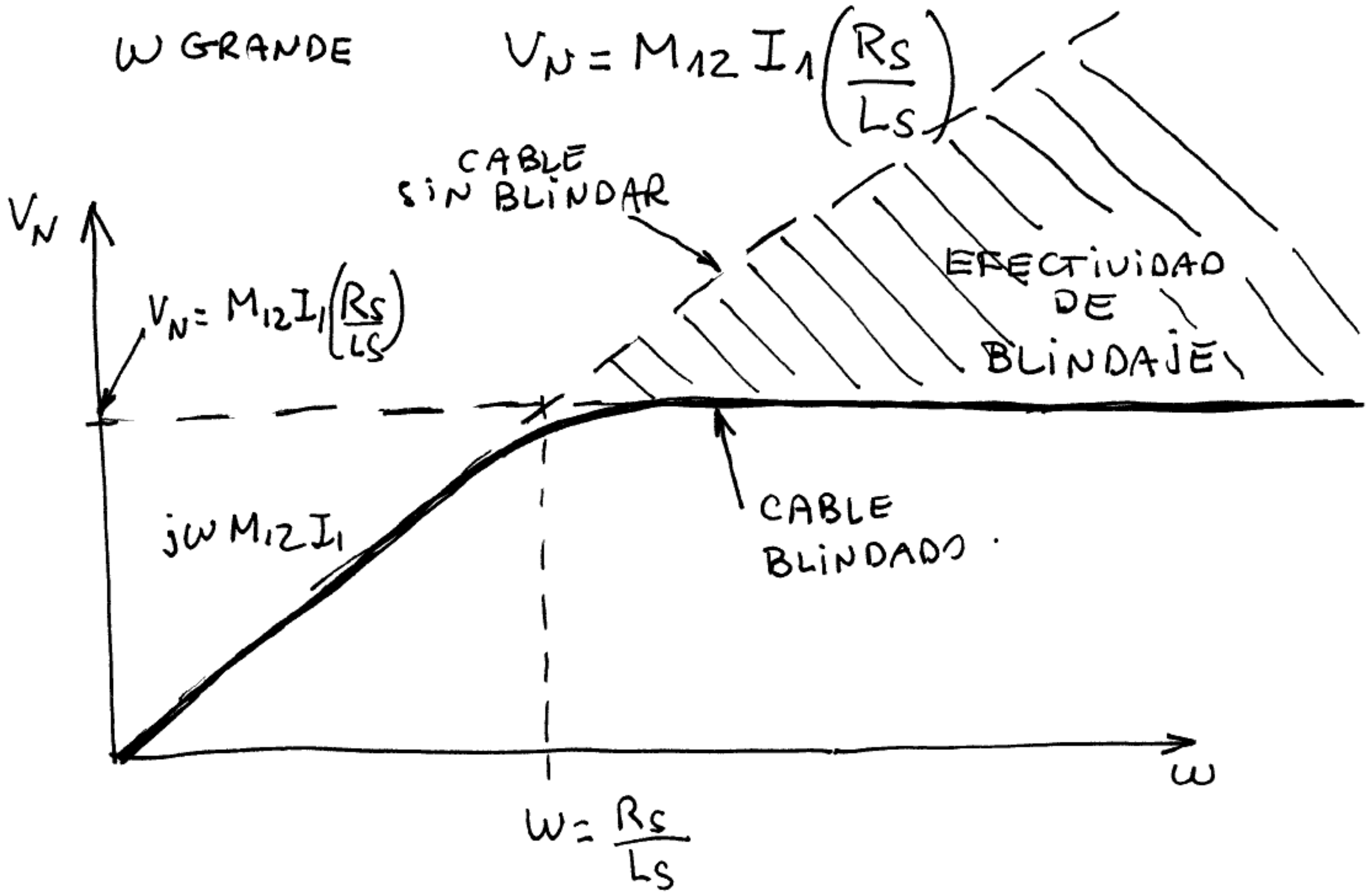

1
CONDUCTOR FUENTE
I1
M12
M1S
Ls
Rs
+
Vs
−
Vs = jω M1S I1
EXTREMOS CONECTADOS A TIERRA
Is
~~CONDUCTOR BLINDADO.~~
BLINDAJE
Ms2
−
Vc
+
+
V2
−
Vc = jω Ms2 Is
V2 = jω M12 I1
CONDUCTOR BLINDADO

$$V_N = V_2 - V_C$$

$$V_N = j\omega M_{12} I_1 \left[\frac{R_S/L_S}{j\omega + R_S/L_S} \right]$$

ω PEQUEÑO $\qquad V_N \cong j\omega M_{12} I_1$

ω GRANDE $\qquad V_N = M_{12} I_1 \left(\frac{R_S}{L_S} \right)$



Si $R_S \downarrow \;\rightarrow\; V_N \downarrow$

R_S: ES LA RESISTENCIA DEL BLINDAJE Y LA RESISTENCIA DE LOS CONTACTOS, Y DE TIERRA.