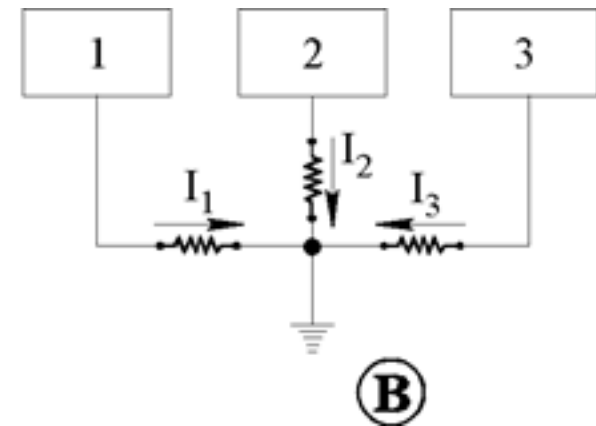
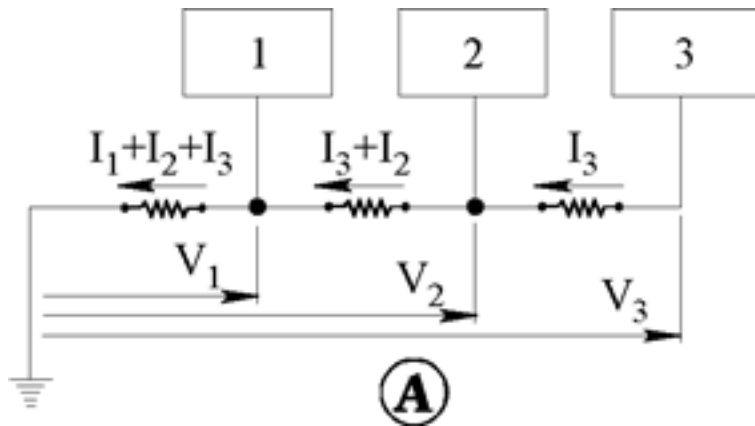
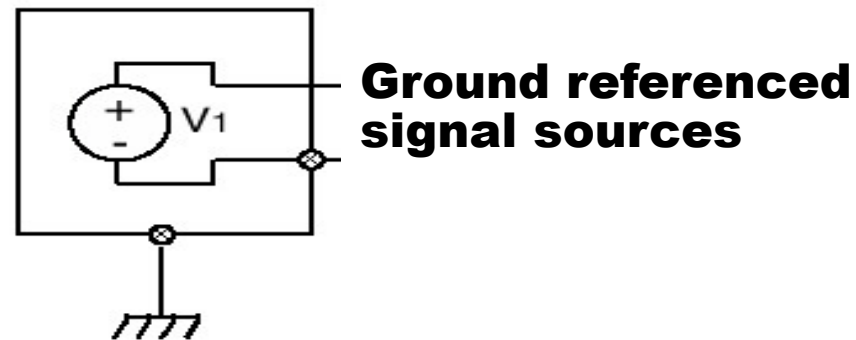
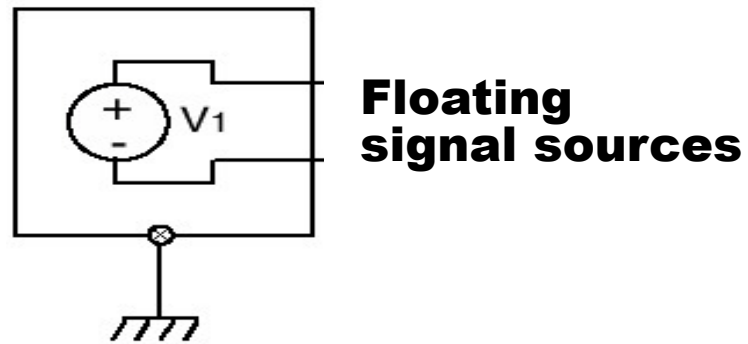


Collegamenti a massa



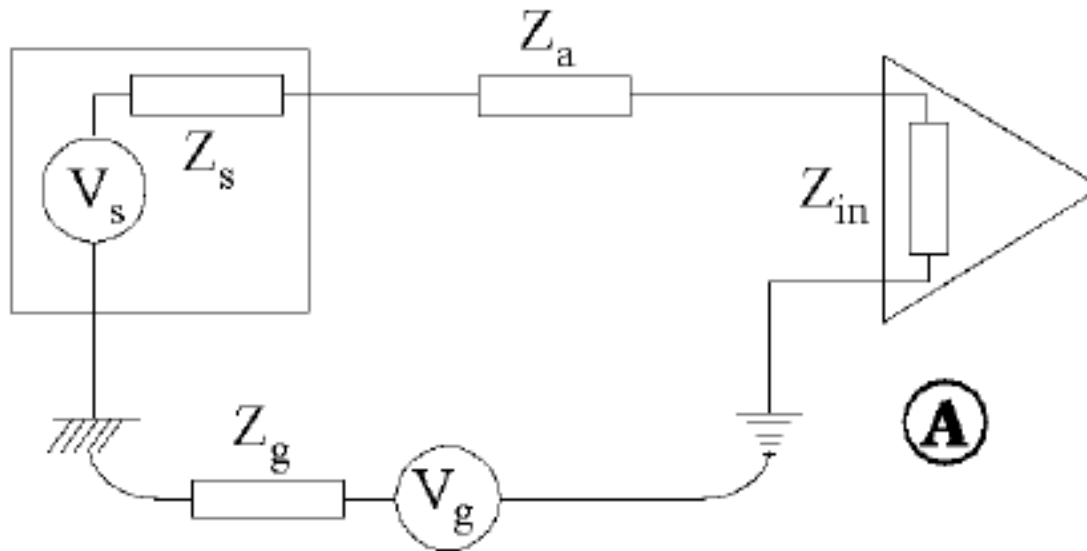
- *common ground (signal ground)*
- *power ground (safety ground, earth ground)*

Sorgente del segnale



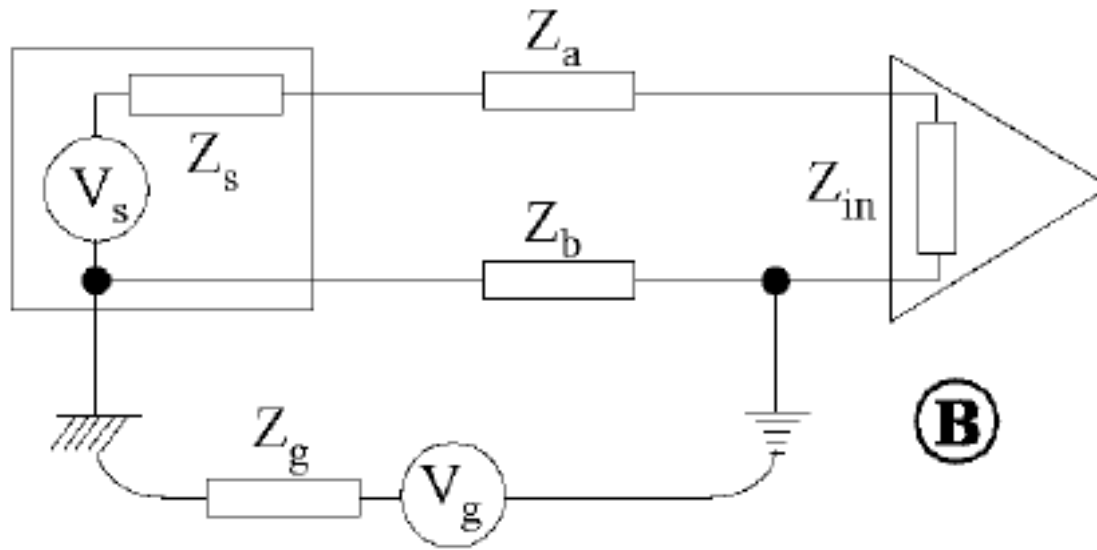
Configurazione *single-ended*

Collegamento con un conduttore

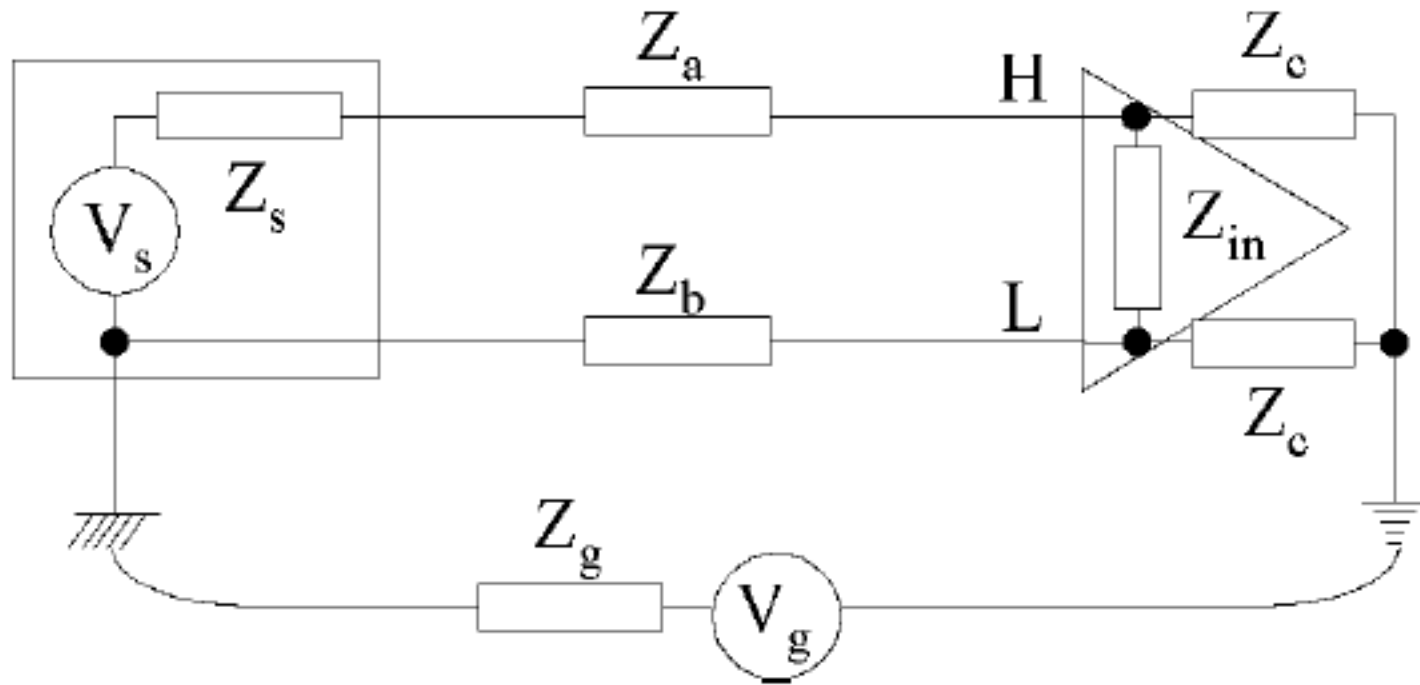


Configurazione *single-ended*

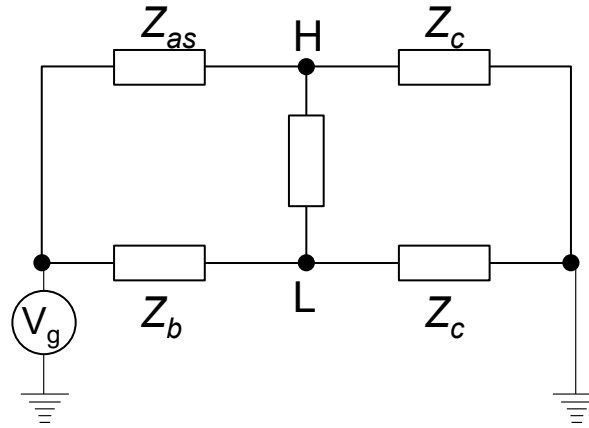
Collegamento con due conduttori



Configurazione differenziale

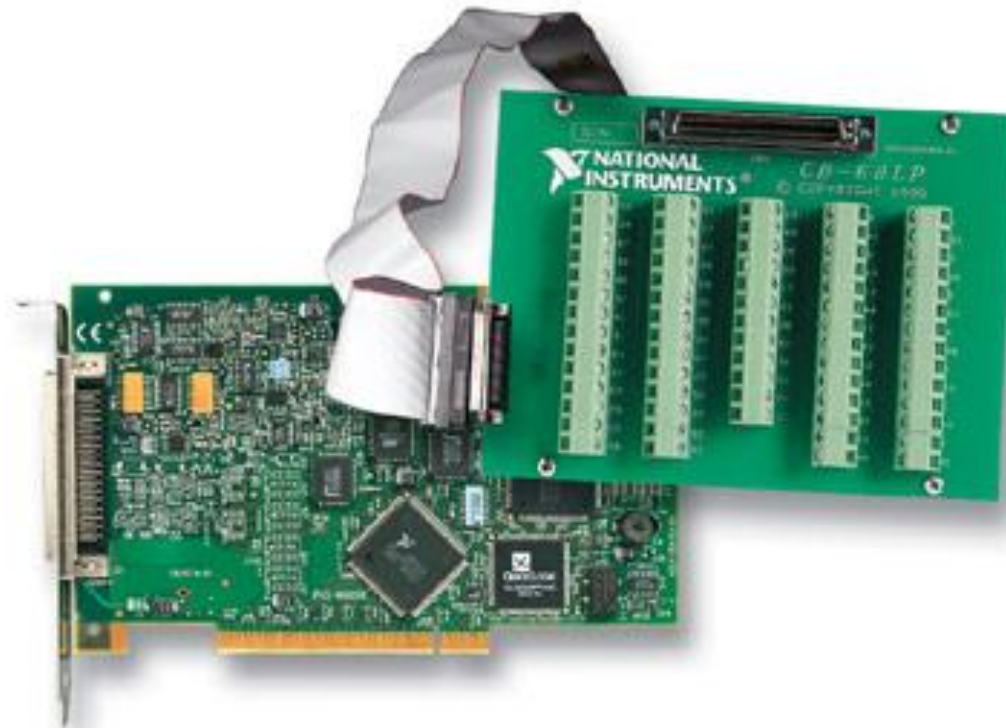


Configurazione differenziale

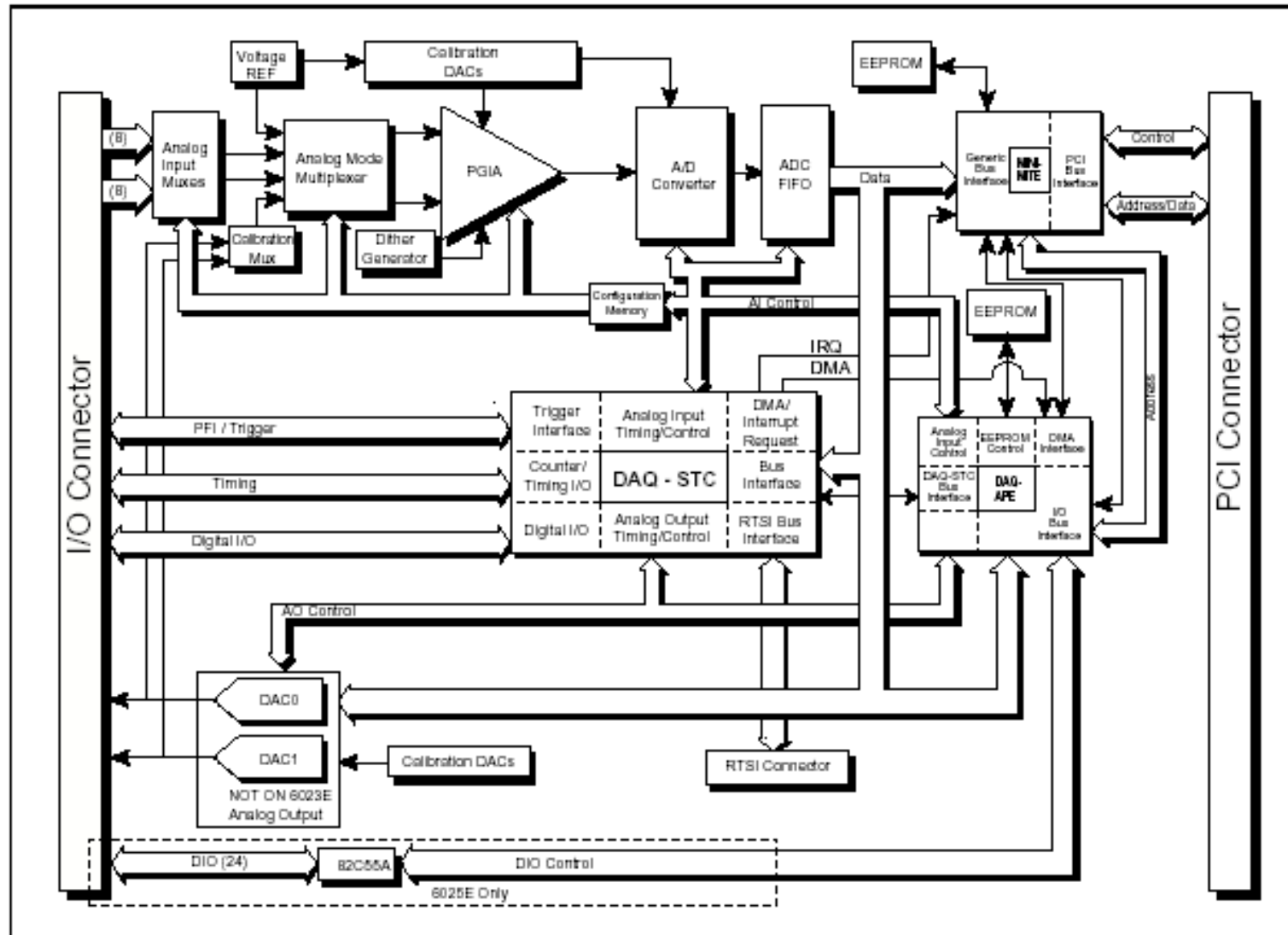


$$V_d = V_H - V_L = \frac{V_g \cdot Z_c}{Z_{as} + Z_c} - \frac{V_g \cdot Z_c}{Z_b + Z_c} = V_g \cdot Z_c \cdot \frac{Z_b - Z_{as}}{(Z_{as} + Z_c) \cdot (Z_b + Z_c)} \cong V_g \cdot \frac{Z_b - Z_{as}}{Z_c}$$

DAQ board



DAQ board



Configurazioni di ingresso

Table 3-1. Available Input Configurations

Configuration	Description
DIFF	A channel configured in DIFF mode uses two analog input lines. One line connects to the positive input of the board's programmable gain instrumentation amplifier (PGIA), and the other connects to the negative input of the PGIA.
RSE	A channel configured in RSE mode uses one analog input line, which connects to the positive input of the PGIA. The negative input of the PGIA is internally tied to analog input ground (AIGND).

DAQ Input

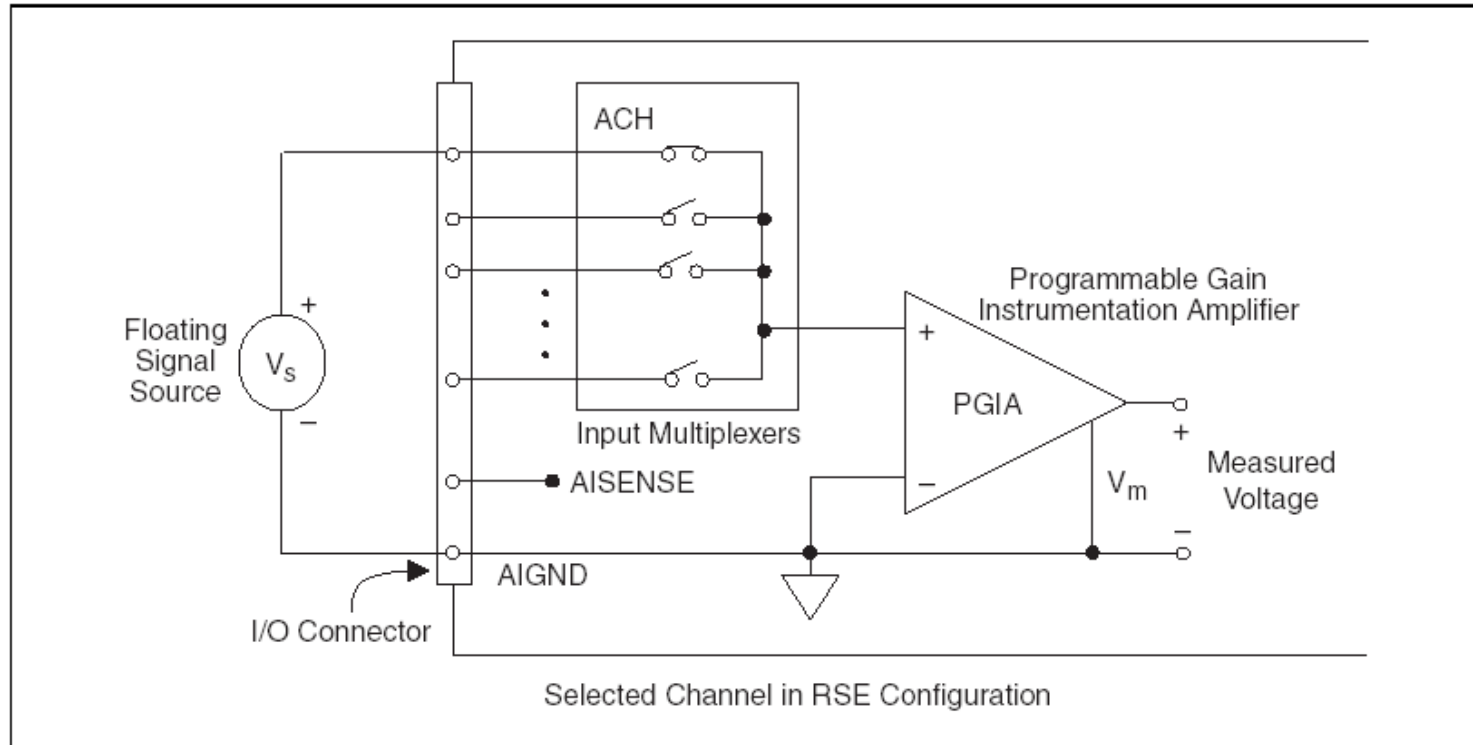


Figure 4-7. Single-Ended Input Connections for Nonreferenced or Floating Signals

DAQ Input

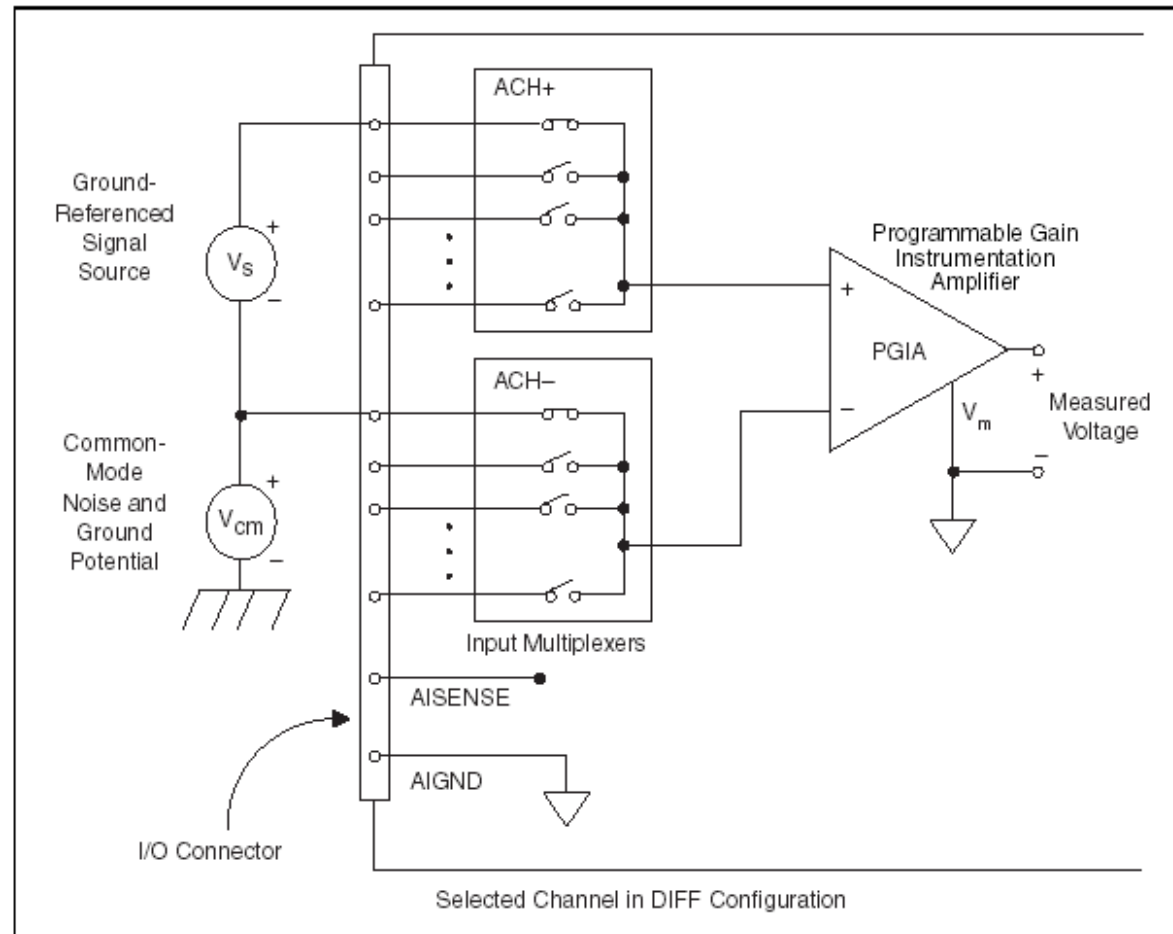
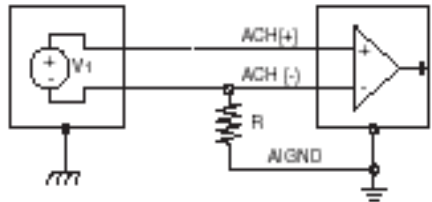
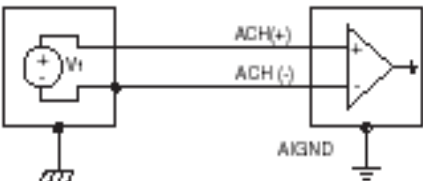

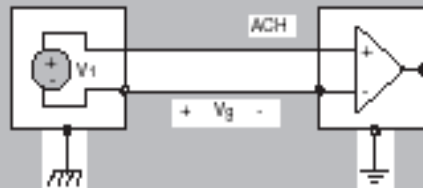
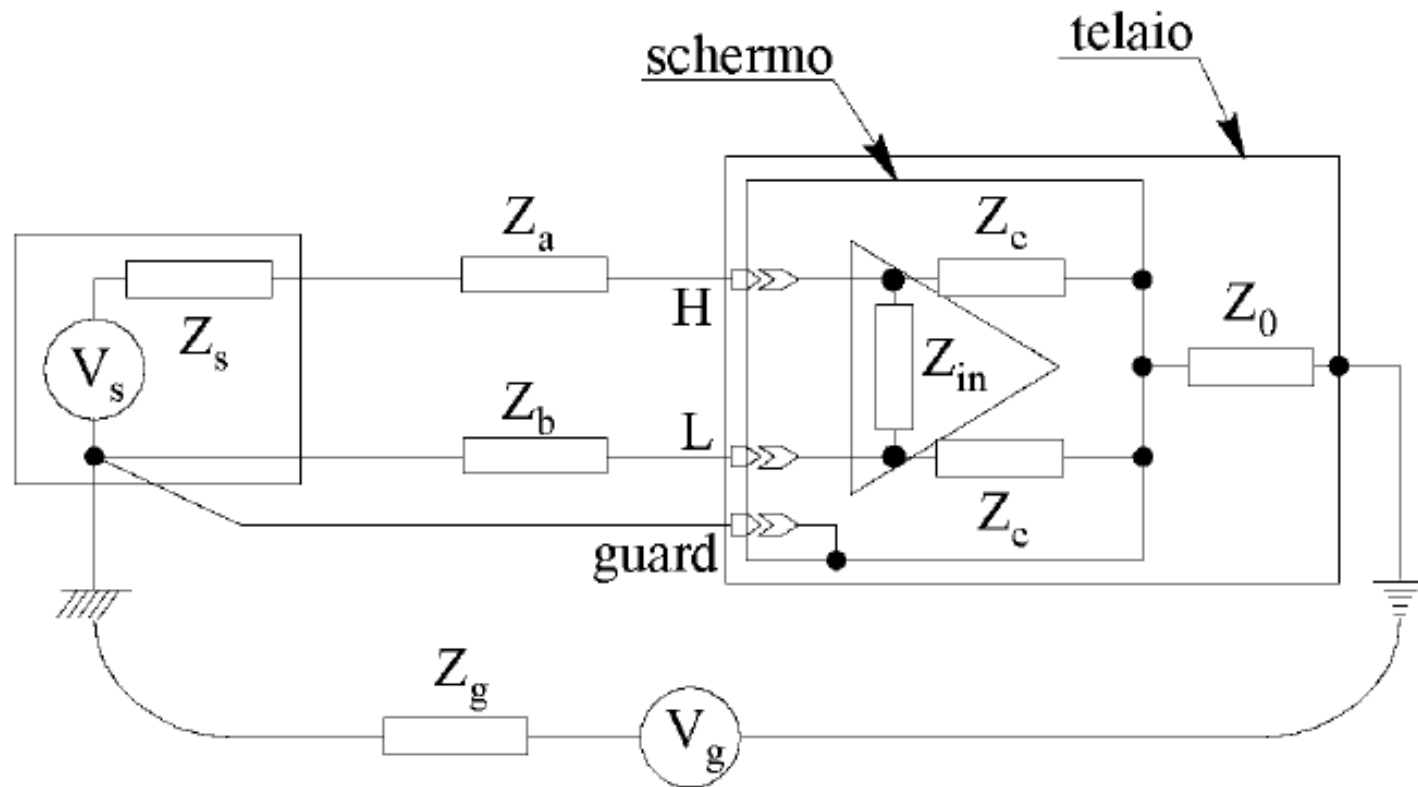


Figure 4-5. Differential Input Connections for Ground-Referenced Signals

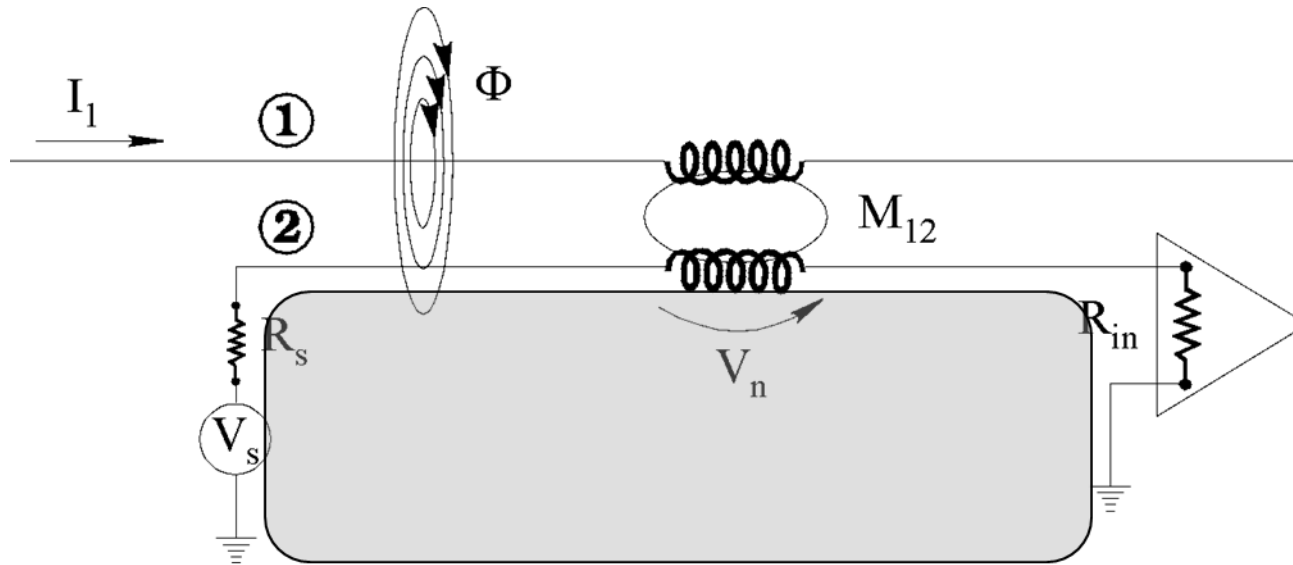
Connessioni di ingresso

	Signal Source Type	
	Floating Signal Source (Not Connected to Building Ground)	Grounded Signal Source
Input	<p>Examples</p> <ul style="list-style-type: none"> • Ungrounded Thermocouples • Signal conditioning with isolated outputs • Battery devices 	<p>Examples</p> <ul style="list-style-type: none"> • Plug-in instruments with nonisolated outputs
Differential (DIFF)	 <p>See text for information on bias resistors.</p>	
Single-Ended — Ground Referenced (RSE)		<p>NOT RECOMMENDED</p>  <p>Ground-loop losses, V_g, are added to measured signal</p>

Configurazione differenziale con tecnica di *guard*



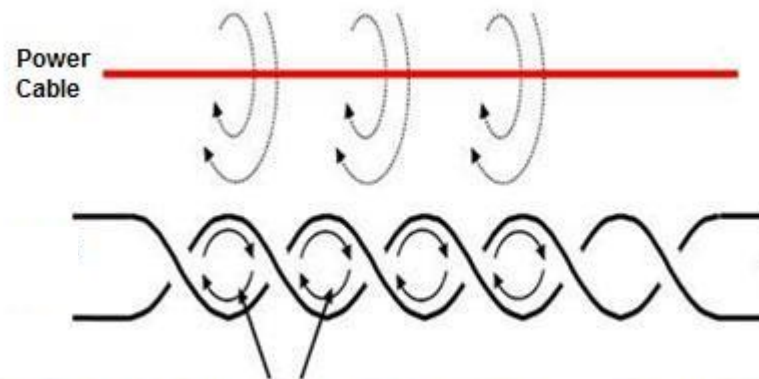
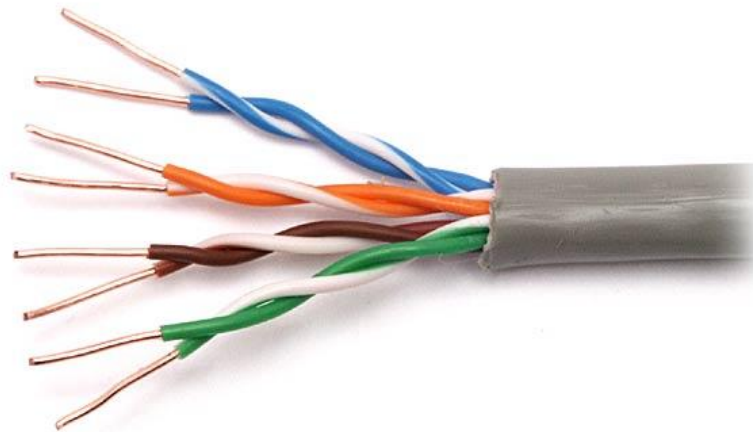
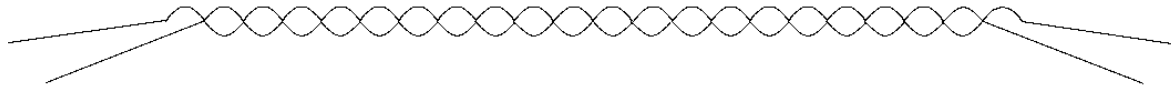
Accoppiamenti induttivi



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

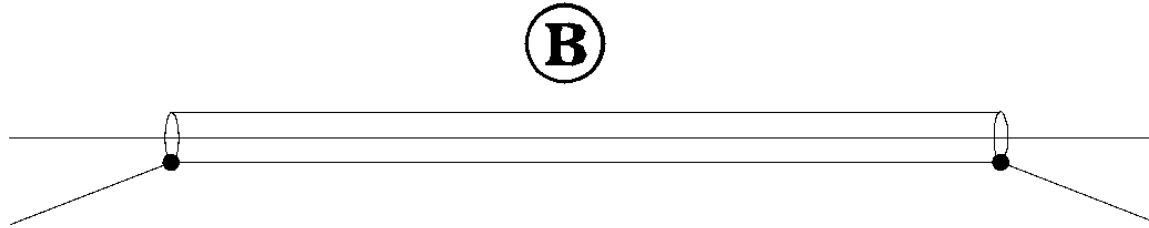
Accoppiamenti induttivi

A

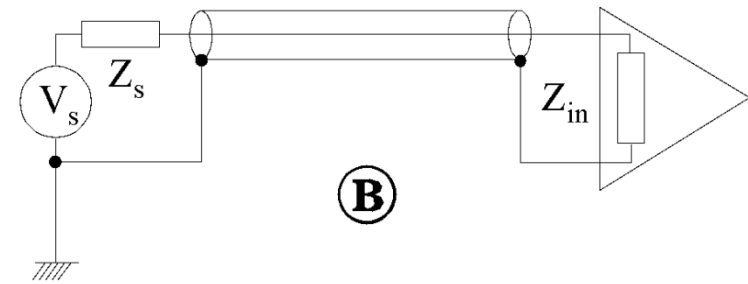
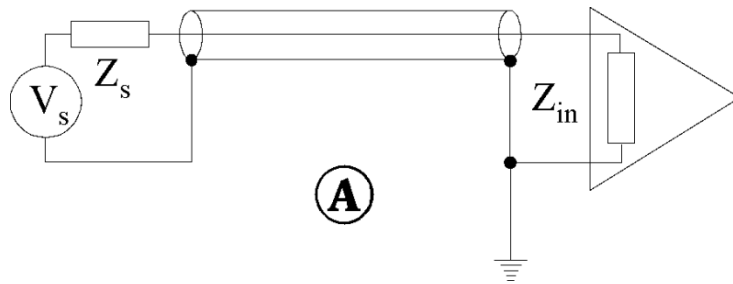


With twisted cable, the induced current tends to be canceled in the adjacent loops

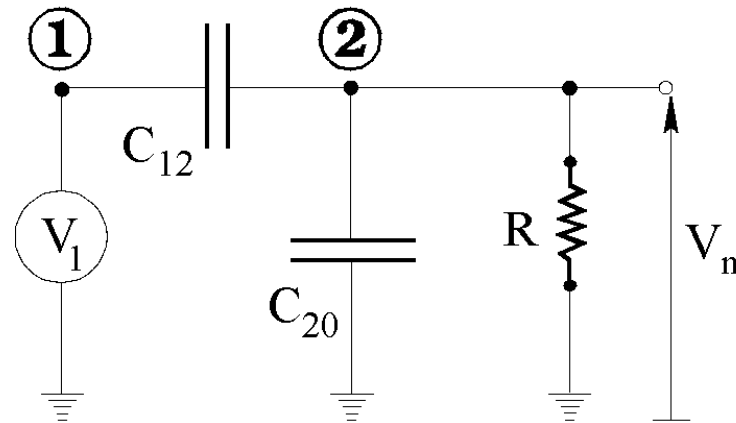
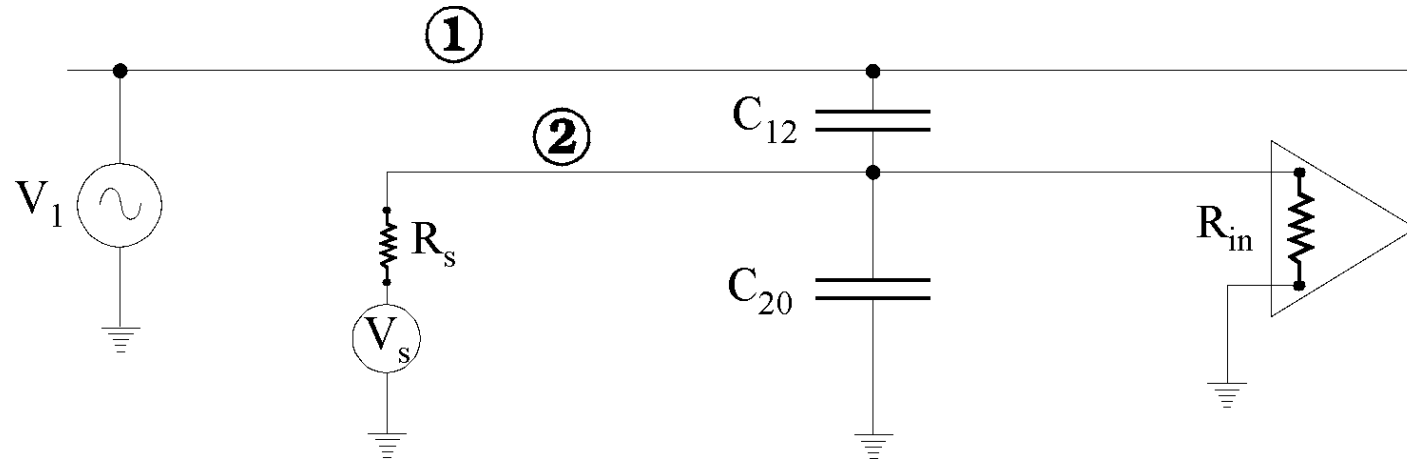
Accoppiamenti induttivi



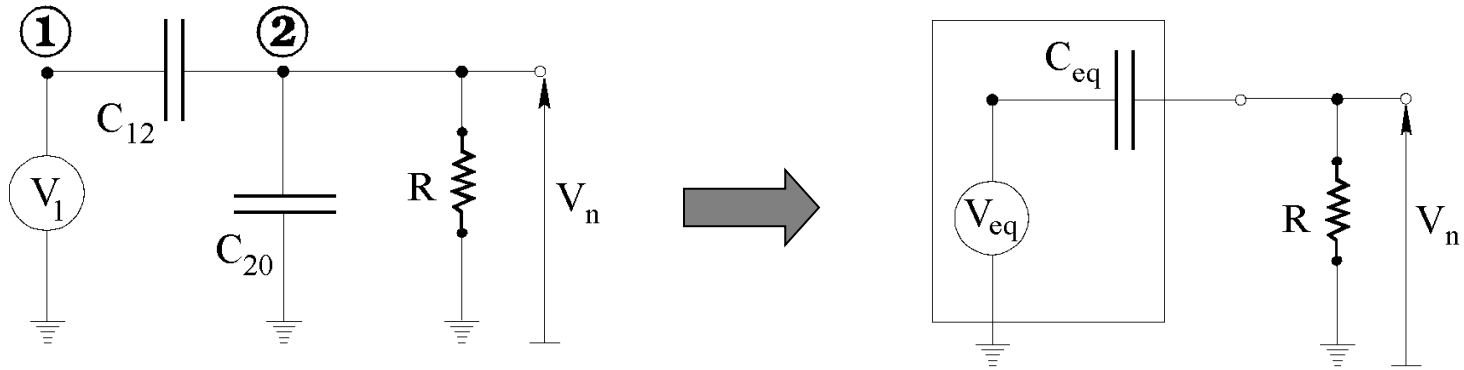
Altri effetti dovuti ai collegamenti a massa



Accoppiamenti capacitivi



Circuiti equivalenti per l'accoppiamento capacitivo

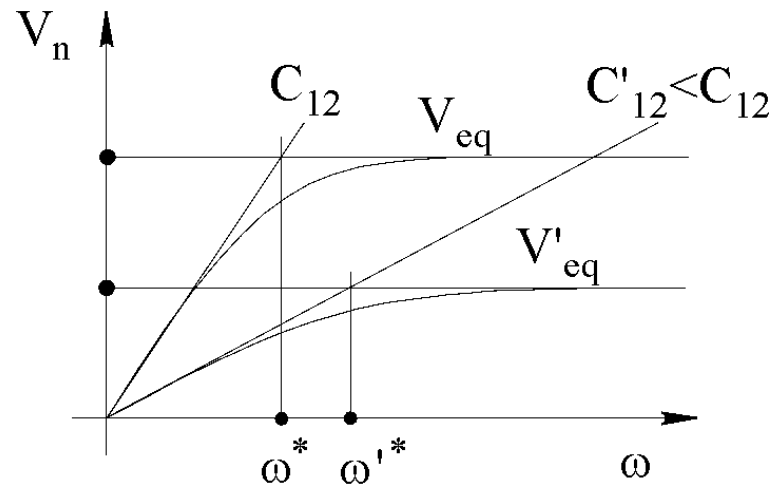


$$C_{eq} = C_{12} + C_{20} \qquad V_{eq} = V_1 \frac{C_{12}}{C_{12} + C_{20}} = V_1 \frac{C_{12}}{C_{eq}}$$

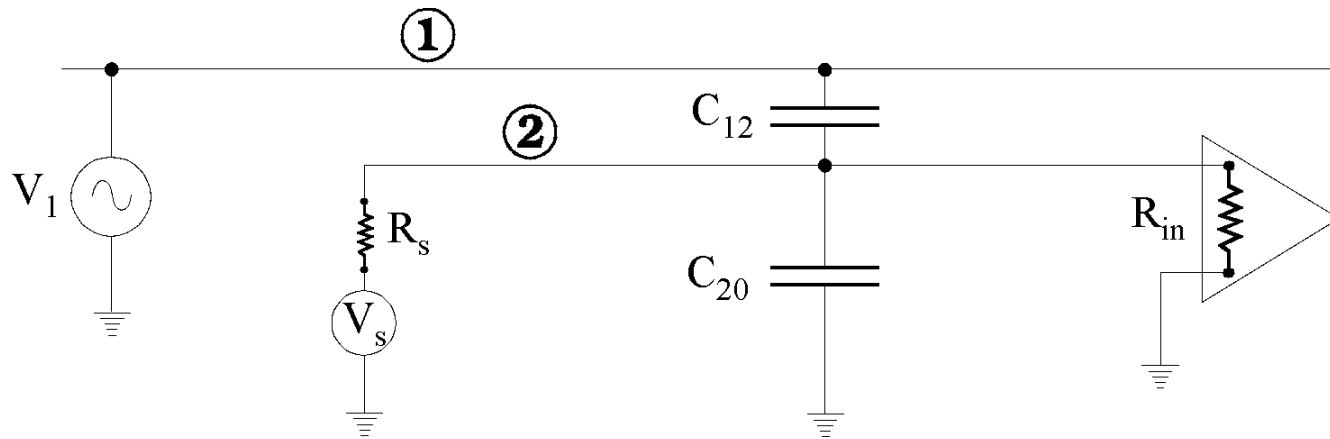
$$V_n = V_{eq} \frac{R}{R + \frac{1}{j\omega C_{eq}}}$$

Effetti dell'accoppiamento capacitivo

$$V_n = V_{eq} \frac{R}{R + \frac{1}{j\omega C_{eq}}} = V_{eq} \frac{j\omega / \omega^*}{1 + j\omega / \omega^*} \quad \left(\text{posto } \omega^* = \frac{1}{RC_{eq}} \right)$$



Accoppiamenti capacitivi: esempio



$$V_1 = 10 \text{ V} \quad f = 100 \text{ kHz} \quad C_{12} = 50 \text{ pF} \quad C_{20} = 150 \text{ pF} \quad R = 50 \text{ } \Omega$$

$$C_{eq} = 200 \text{ pF} \text{ e } V_{eq} = 2,5 \text{ V}$$

$$\omega^* = 1/(50 \cdot 200 \cdot 10^{-12}) = 10^8 \text{ rad/s} \quad \omega = 2\pi 10^5 \text{ rad/s} \ll \omega^*$$

$$|V_n| \approx V_{eq} \omega / \omega^* = 15,7 \text{ mV}$$

Effetto dello schermo

