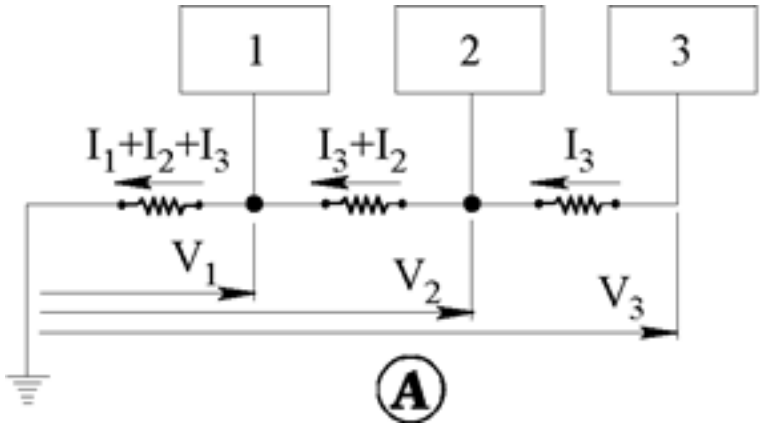
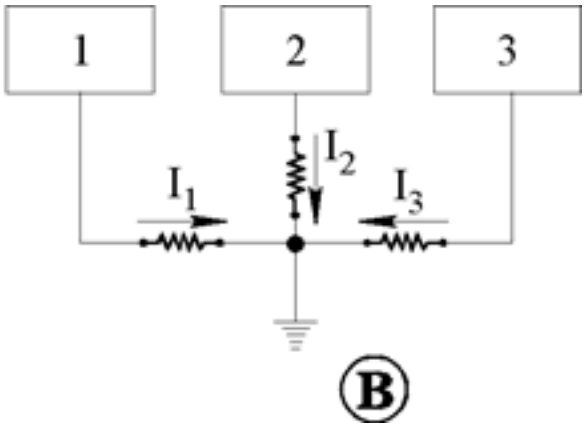
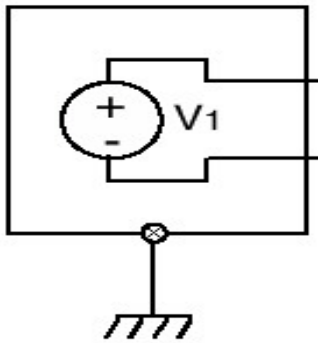
Collegamenti a massa



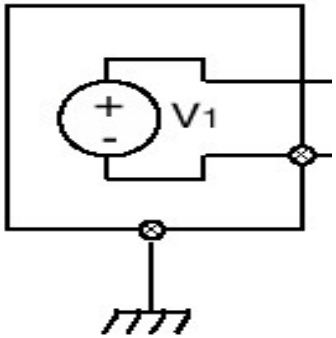


- *common ground* (*signal ground*)
- *power ground* (*safety ground, earth ground*)

Sorgente del segnale



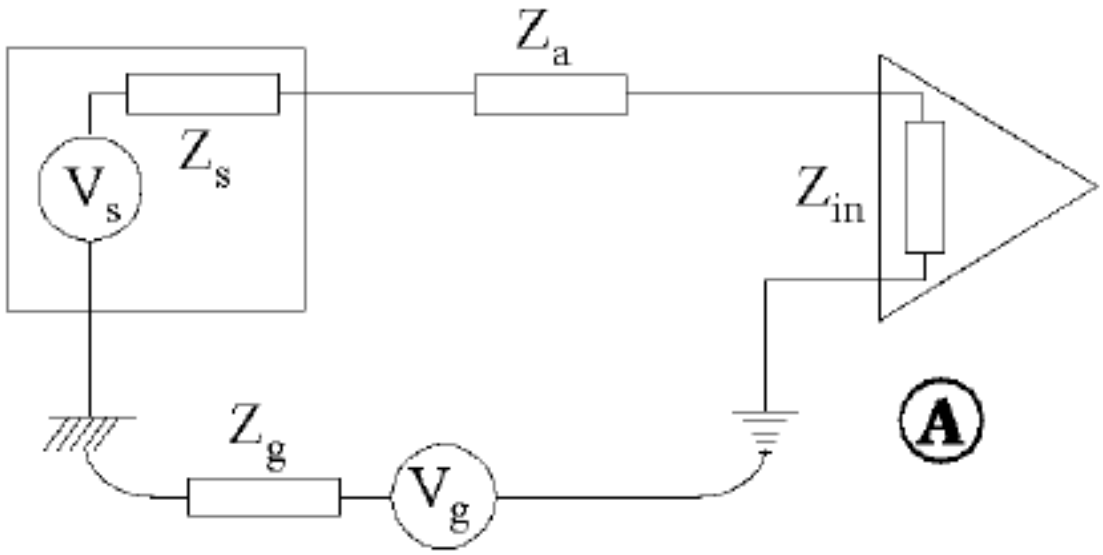
Floating signal sources



Ground referenced signal sources

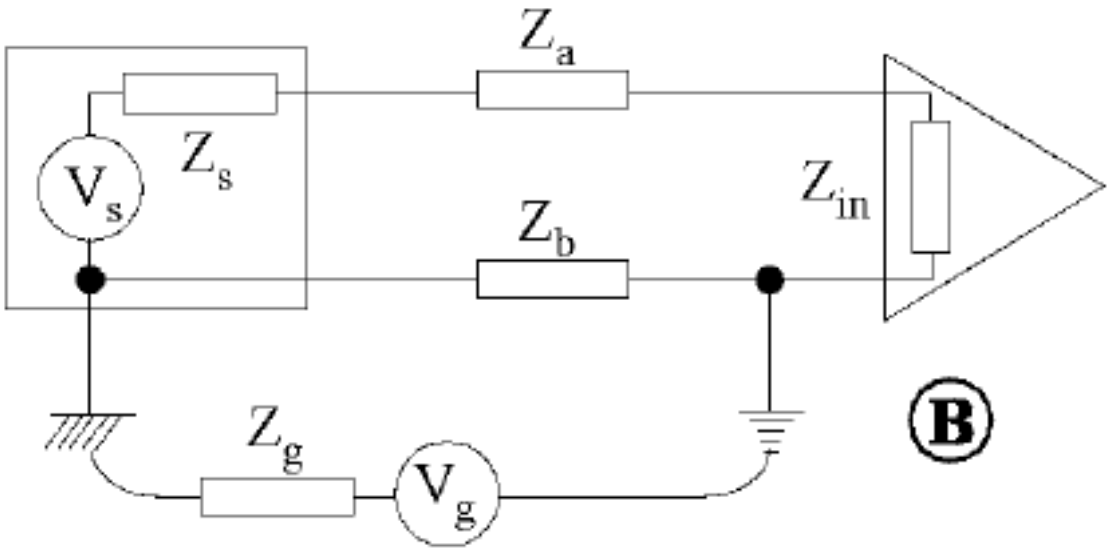
Configurazione *single-ended*

Collegamento con un conduttore

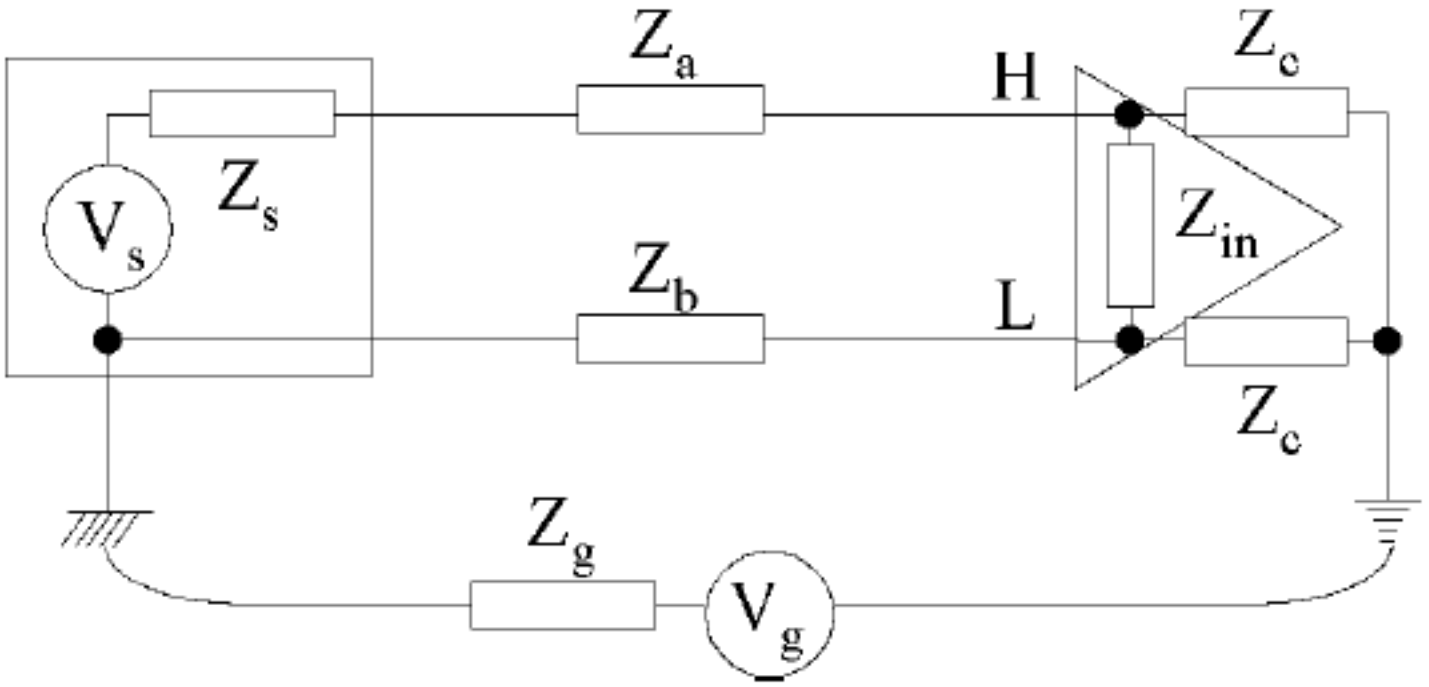


Configurazione *single-ended*

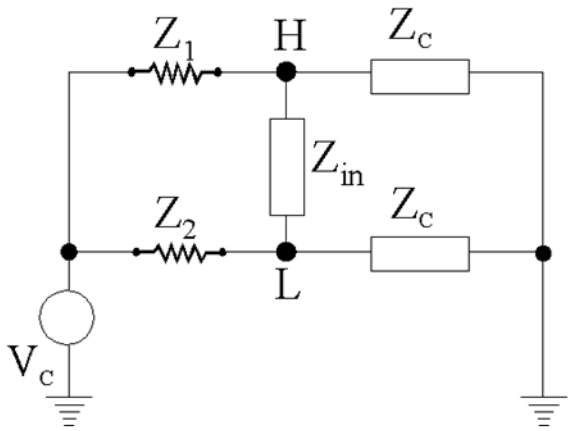
Collegamento con due conduttori



Configurazione differenziale



Il bilanciamento degli ingressi

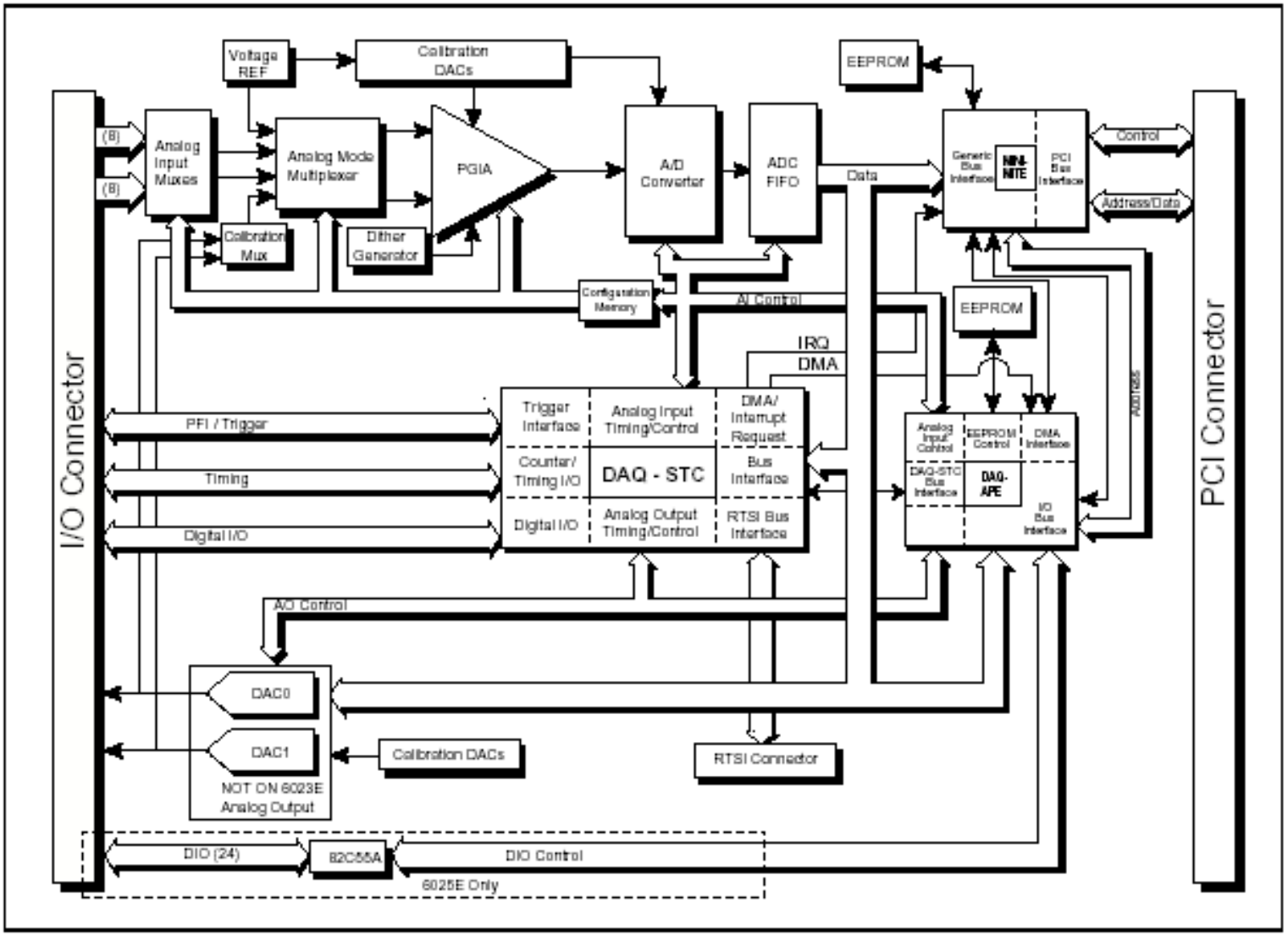


$$V_T = [V_H - V_L]_0 = \frac{V_C Z_C}{Z_1 + Z_C} - \frac{V_C Z_C}{Z_2 + Z_C} =$$

$$= V_C Z_C \frac{Z_2 - Z_1}{(Z_C + Z_1)(Z_C + Z_2)} \cong V_C \frac{\Delta Z}{Z_C}$$

DAQ board

DAQ board


Voltage REF
Calibration DACs
EEPROM
(8)
(8)
Analog Input Muxes
Analog Mode Multiplexer
PGIA
A/D Converter
ADC FIFO
Data
Generic Bus Interface
NI-MITE
PCI Bus Interface
Control
Address/Data
Calibration Mux
Dither Generator
Configuration Memory
AI Control
EEPROM
IRQ
DMA
I/O Connector
PCI Connector
PFI / Trigger
Timing
Digital I/O
Trigger Interface
Analog Input Timing/Control
DMA/ Interrupt Request
Counter/ Timing I/O
DAQ - STC
Bus Interface
Digital I/O
Analog Output Timing/Control
RTSI Bus Interface
Analog Input Control
EEPROM Control
DMA Interface
DAQ-STC Bus Interface
DAQ-APE
I/O Bus Interface
Address
AO Control
DAC0
DAC1
NOT ON 6023E
Analog Output
Calibration DACs
RTSI Connector
DIO (24)
82C55A
DIO Control
6025E Only

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

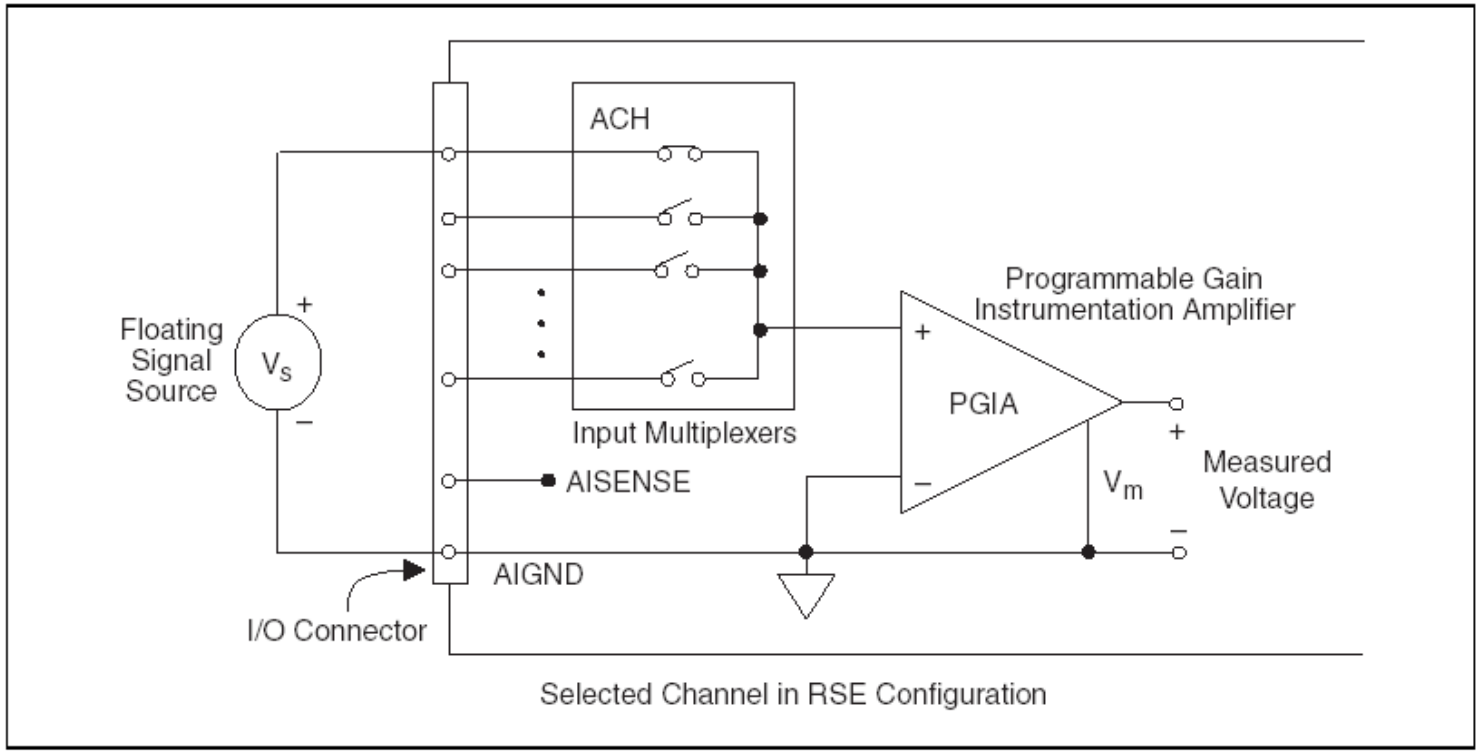


Figure 4-7. Single-Ended Input Connections for Nonreferenced or Floating Signals

DAQ Input

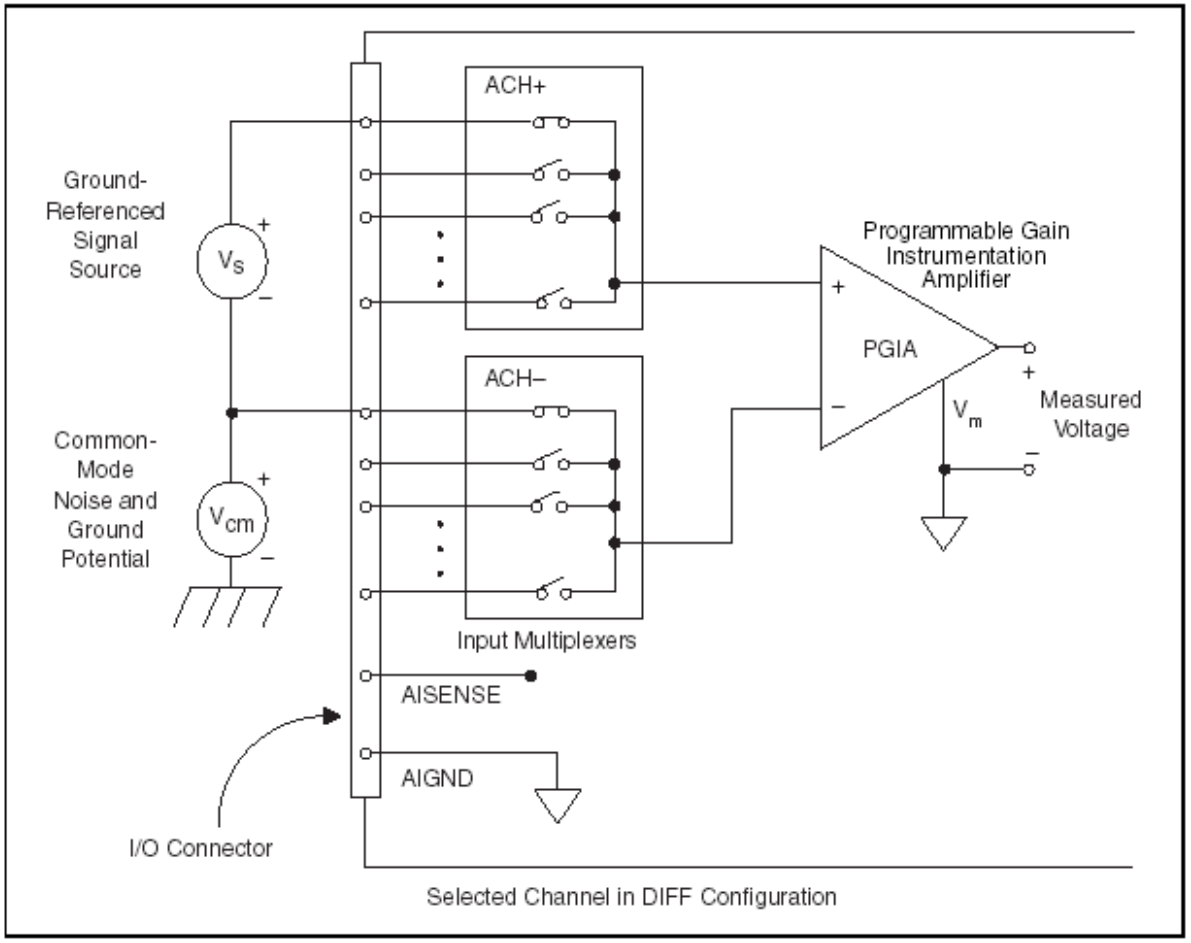
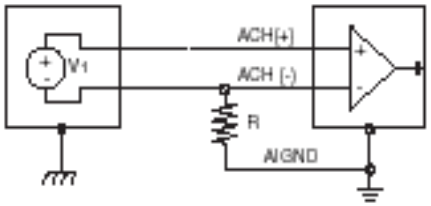
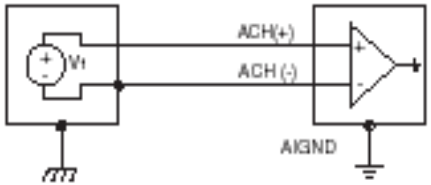
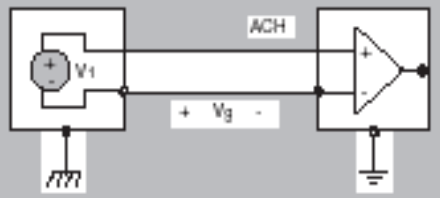


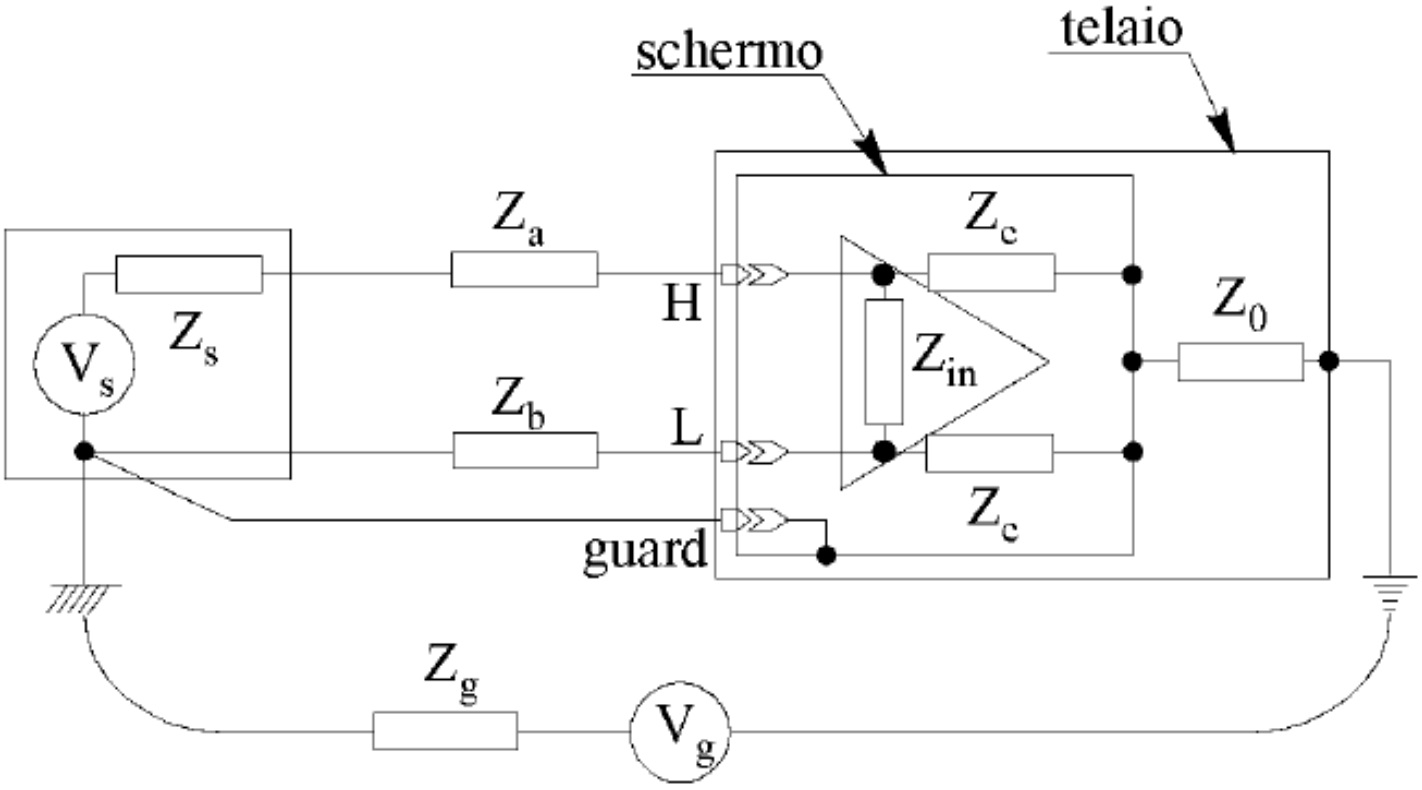
Figure 4-5. Differential Input Connections for Ground-Referenced Signals

Connessioni di ingresso

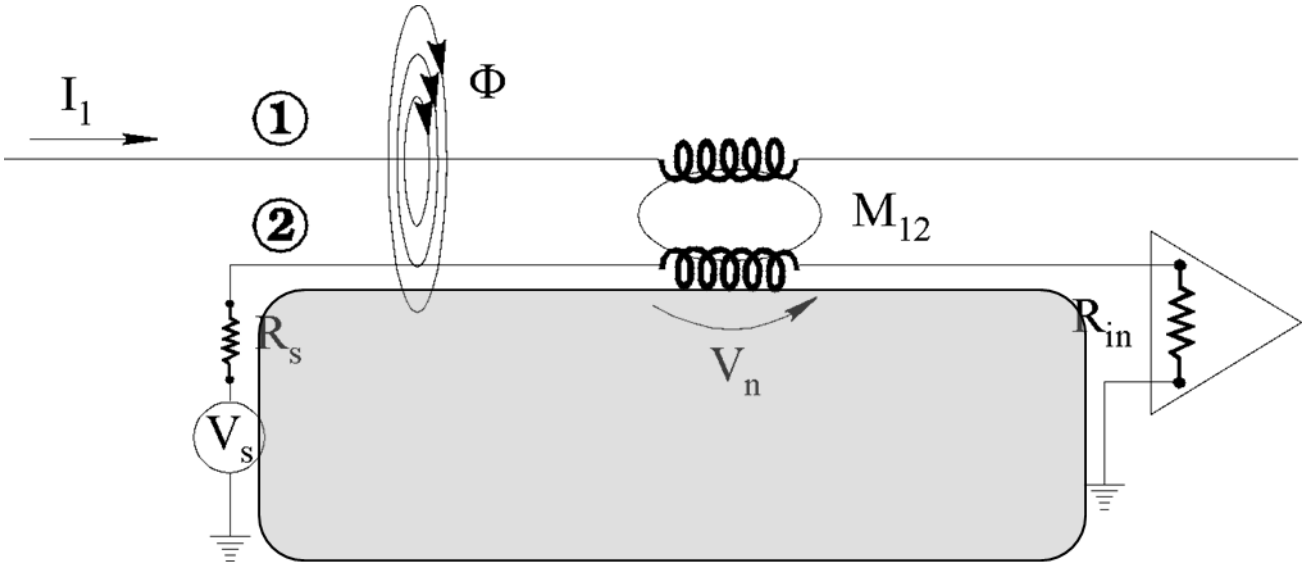
Input	Signal Source Type	
	Floating Signal Source (Not Connected to Building Ground)	Grounded Signal Source
	Examples • Ungrounded Thermocouples • Signal conditioning with isolated outputs • Battery devices	Examples • Plug-in instruments with nonisolated outputs
Differential (DIFF)	 See text for information on bias resistors.	
Single-Ended — Ground Referenced (RSE)		NOT RECOMMENDED  Ground-loop losses, V_g, are added to measured signal

Configurazione differenziale

con tecnica di guard

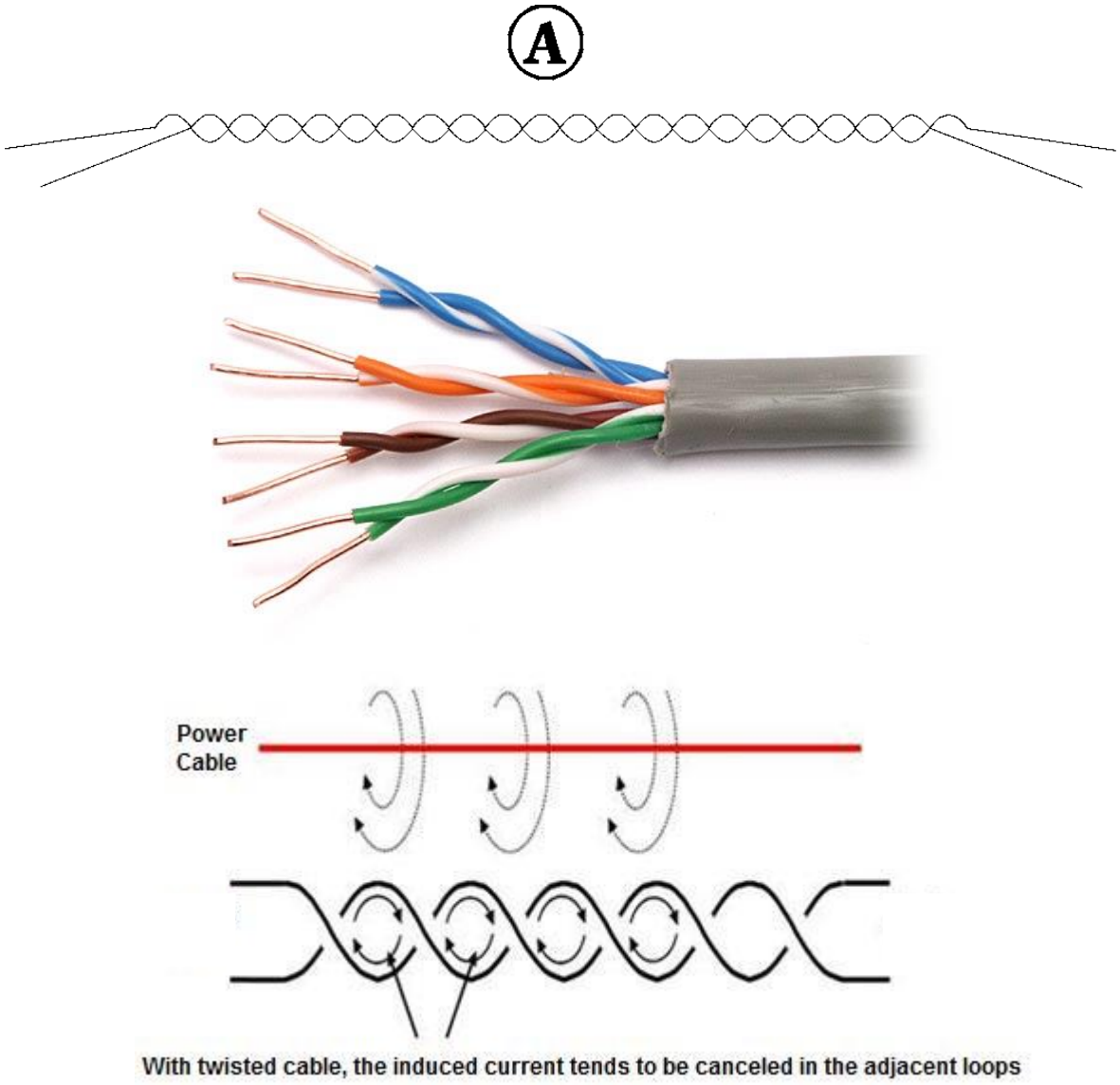


Accoppiamenti induttivi

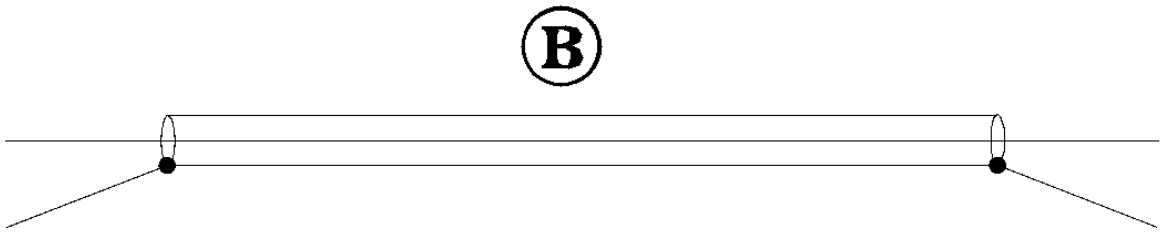


$$V_n = j\omega M_{12} I_1$$

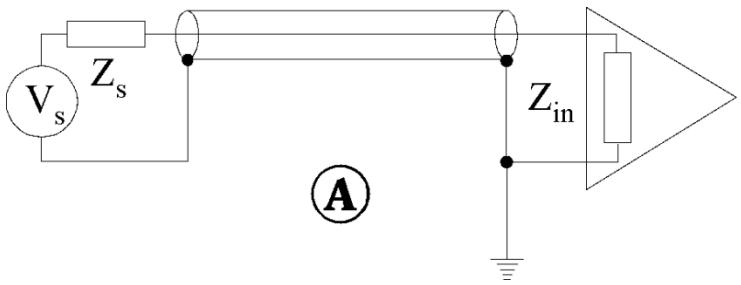
Accoppiamenti induttivi

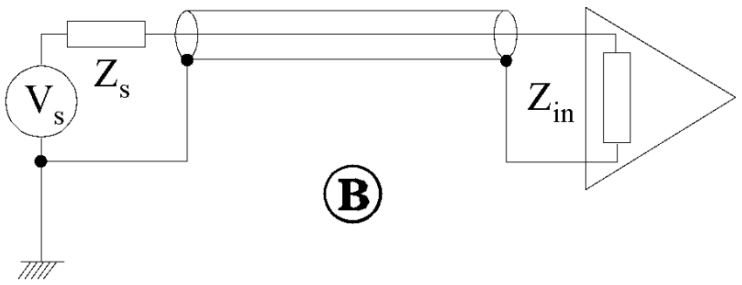


Accoppiamenti induttivi

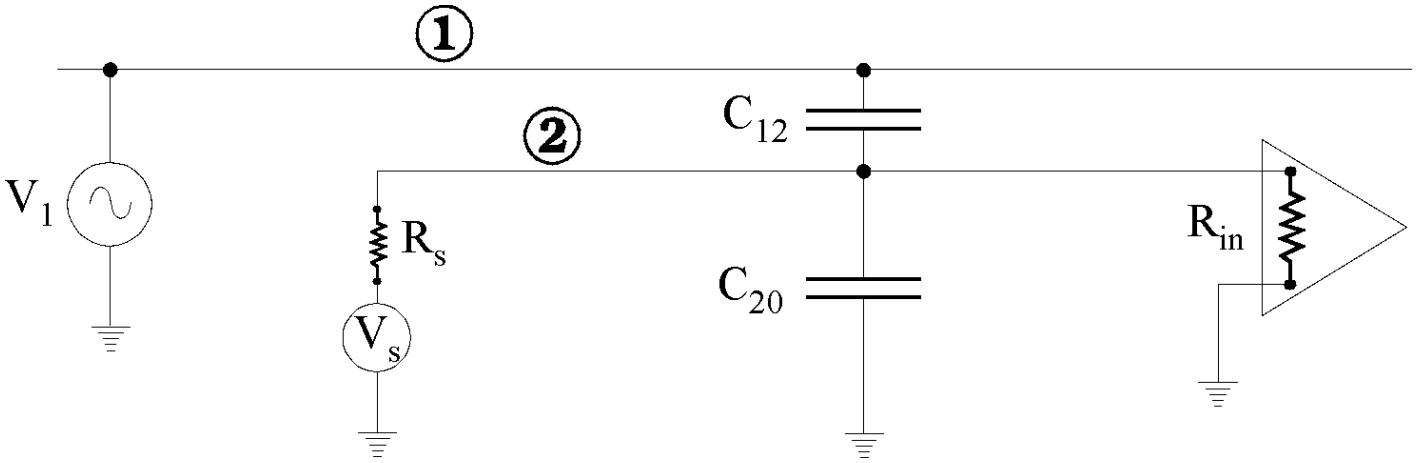


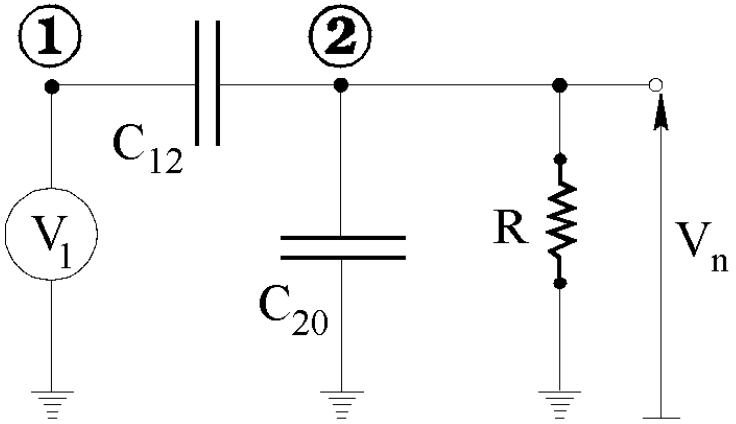
Altri effetti dovuti ai collegamenti a massa



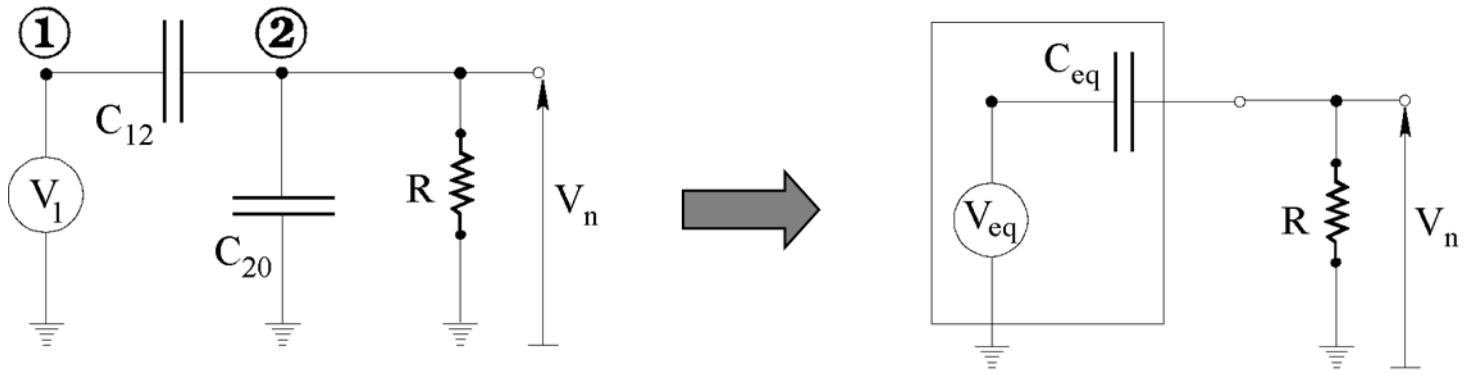


Accoppiamenti capacitivi





Circuiti equivalenti per l'accoppiamento capacitivo

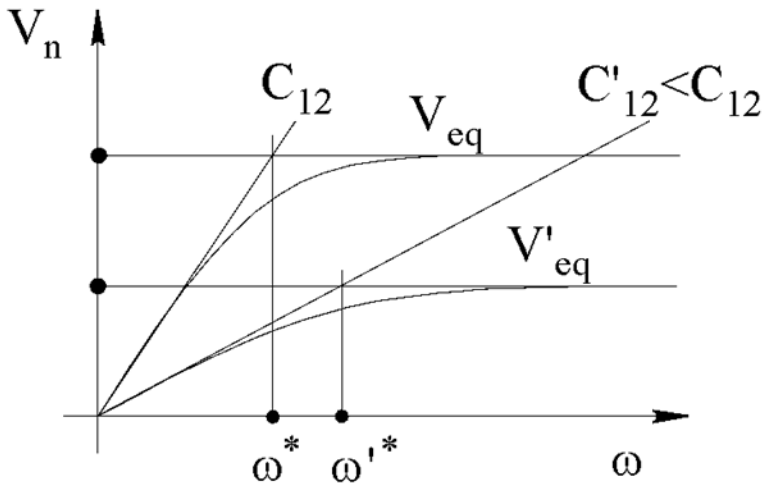


$$C_{eq} = C_{12} + C_{20} \qquad V_{eq} = V_1 \frac{C_{12}}{C_{12} + C_{20}} = V_1 \frac{C_{12}}{C_{eq}}$$

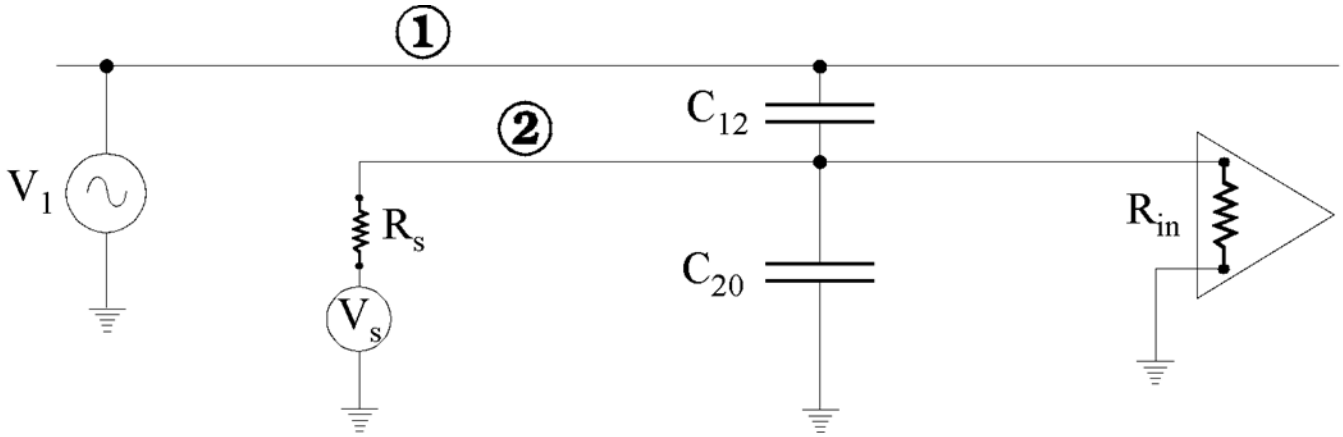
$$V_n = V_{eq} \frac{R}{R + \dfrac{1}{j\omega C_{eq}}}$$

Effetti dell'accoppiamento capacitivo

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



Accoppiamenti capacitivi: esempio



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

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

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

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

Effetto dello schermo