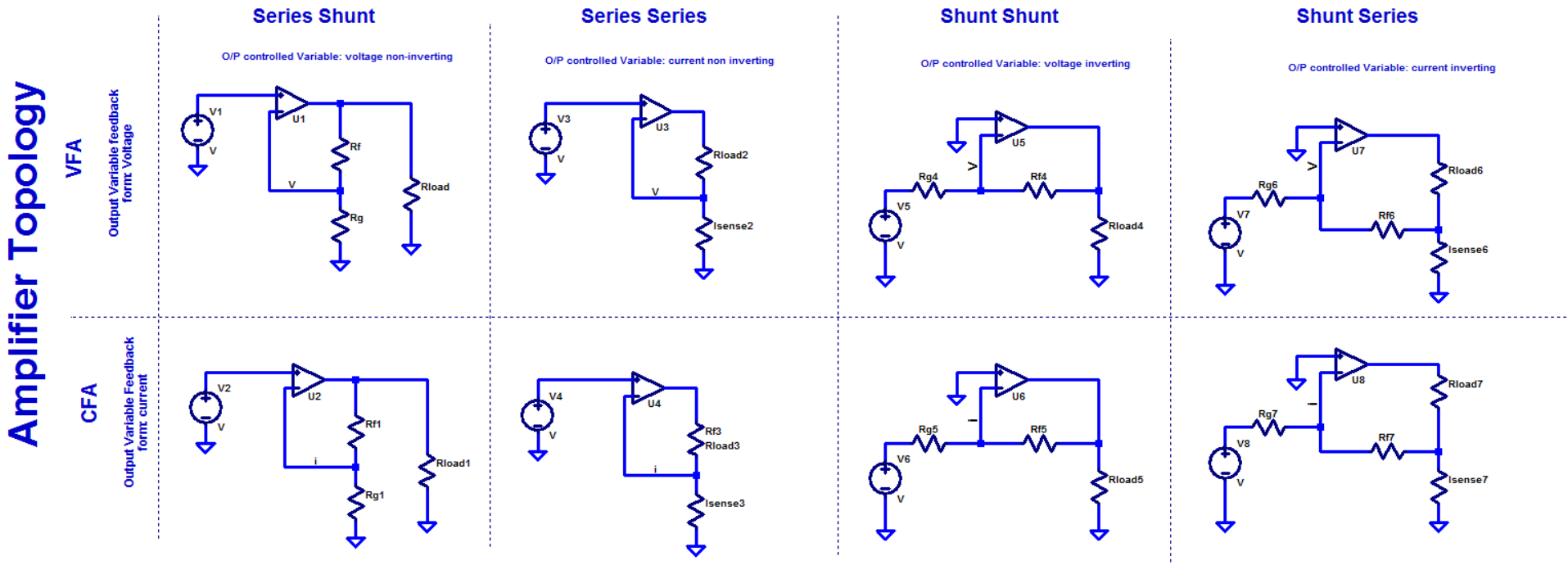
Feedback topology or mode



This table shows how the canonical feedback mode relates to amplifier topology. The feedback topology or mode axis is concerned with two things: what the (1) amplifier output controlled variable is, and (2) how the feedback network is sampling the controlled variable.

Series-Shunt – Input signal in series with feedback; feedback from output is in parallel (i.e shunts) the signal and load

Series-Series – input signal is in series with feedback; feedback from output is in series with load

Shunt-Shunt – feedback input shunts the input source; feedback from the output is in parallel with the load

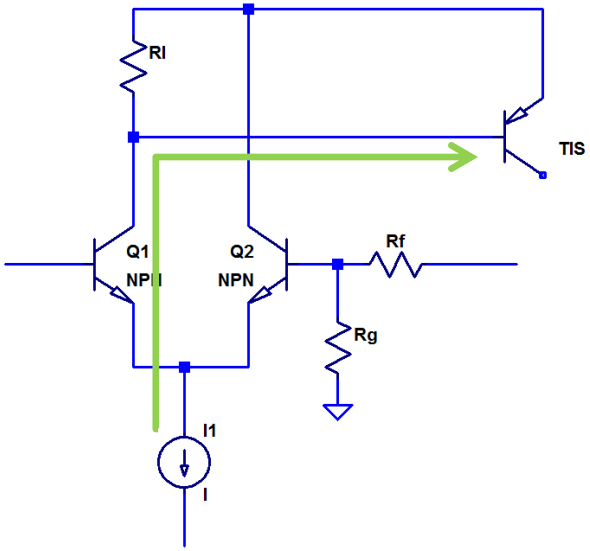
Shunt-Series – Input signal is shunted by the feedback signal; feedback from output is in series with the load

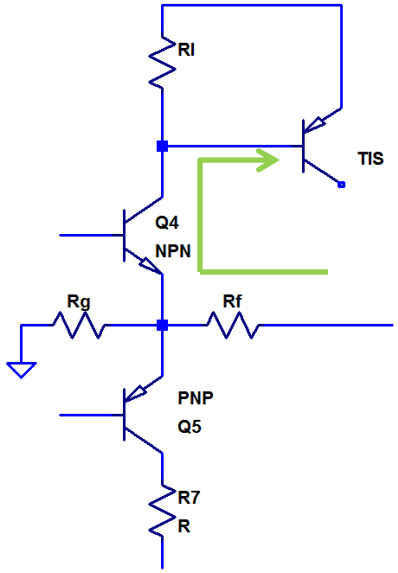
Note the inverting input electrical quantity for each of the amplifiers, labelled V or I. Note that both CFA and VFA can be configured for *any* of the four feedback modes, as shown above. You therefore cannot use canonical feedback analysis to support the notion that CFA=VFA. Further, see the derivation of the VFA and CFA gain equations which explain the fundamental differences in the operation of CFA and VFA amplifiers

How to tell if an amplifier is VFA or CFA – three tests and two pointers

Test	Detail	VFA	CFA
1	What determines the peak current into the TIS/TAS?	The LTP current	Vo_{peak}/Rf
2	Is the amplifier constant gain bandwidth constrained	Yes. -3dB CL BW linked to CLG	No. -3 dB CL BW independent of CLG

Pointer	Detail	VFA	CFA
1	Are both inv and non-inv inputs high Z?	Yes – both + IP and – IP are Hi Z	No. + IP is Hi-Z; - IP is Lo Z
2	How many gain stages in the basic (classic) topology	At least 2 – LTP and TIS	1 – TIS or TAS structure





- VFA: Peak current into TIS cannot be higher than I1

- CFA: Peak current into TIS determined by value of Rf