Identify the feedback configuration for the 4 circuits below and circle the feedback network.
I. (20 pts): Feedback Loop and Feedback Network Identification

For the 4 networks below

- (a) Circle the feedback loop.
- (b) Identify next to each feedback amplifier which of the four feedback configuration you are dealing with, i.e., series-series, series-shunt, shunt-series, or shunt-shunt.
I. (12 pts) In the circuits below, identify the type of feedback used (series-shunt, series-series, shunt-series, or shunt-shunt) and circle the feedback network. Just write the type of configuration you think the amplifier is. No need to explain why.
Transistor amplifier with shunt-series feedback.
Example of series-series feedback topology.
SERIES-SERIES CONFIGURATION

Fig. 8.6 An example of the series-series feedback topology.

SHUNT-SHUNT CONFIGURATION

Fig. 8.7 The inverting op-amp configuration as an example of shunt-shunt feedback.
SERIES-SHUNT CONFIGURATION

\[ \text{A amplifier} \]

\[ \text{feedback network} \]

Fig. E8.1

SHUNT-SERIES CONFIGURATION

\[ \text{Fig. 8.5 A transistor amplifier with shunt-series feedback.} \]
\[
\begin{bmatrix}
I_1 \\
I_2
\end{bmatrix} =
\begin{bmatrix}
G_{11} & G_{12} \\
G_{21} & G_{22}
\end{bmatrix}
\begin{bmatrix}
V_1 \\
V_2
\end{bmatrix}
\]

(1) \[ G_{11} = \frac{I_1}{V_1} \bigg|_{I_2=0} \quad G_{12} = \frac{I_1}{V_2} \bigg|_{V_1=0} \]

(2) \[ G_{21} = \frac{V_2}{I_1} \bigg|_{I_2=0} \quad G_{22} = \frac{V_2}{I_2} \bigg|_{V_1=0} \]

\[ R_1 = G_{11}^{-1} = \frac{1}{R_F + R_{E_2}} \]

\[ G_{22} = R_2 = \left(\frac{R_F}{R_{E_2}}\right) \]

\[ G_{12} = B = \frac{-R_{E_2}}{R_{E_2} + R_F} \]

\[ I_1 = -\frac{R_{E_2}}{R_{E_2} + R_F} \bigg|_{I_2} \]