A_1: First stage gain.
A_2: High-pass filter gain at known frequency.
A_3: AC voltage gain of third part.
fc_1: High-pass filter cutoff frequency.
A_4: DC voltage gain of third part.
fc_2: Low-pass filter cutoff frequency.

SPICE [461] computed the amplifier's incremental sensitivity matrix by simulation:

$$\begin{bmatrix} -0.91 & 1 & 0 & 0 & 0 & 0 & 0 & A_1 \\ 0 & 0 & 0.58 & 0.38 & 0 & 0 & 0 & A_2 \\ 0 & 0 & -0.91 & -0.89 & 0 & 0 & 0 & fc_1 \\ 0 & 0 & 0 & 0 & -0.96 & 0.48 & -0.48 & A_3 \\ 0 & 0 & 0 & 0 & -0.97 & -0.97 & 0 & A_4 \\ 0 & 0 & 0 & 0 & 0 & -0.88 & -0.91 & fc_2 \\ R_1 & R_2 & C_1 & R_3 & R_4 & R_5 & C_2 & \backslash \end{bmatrix} \tag{11.27}$$

Figure 11.7 is the equivalent bipartite graph of this incremental sensitivity matrix.

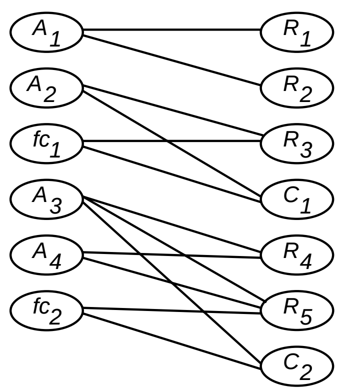

Figure 11.7: Bipartite graph of amplification circuit.

Sensitivity and Analog Circuit Testing

Graph modeling for sensitivity-based analog test generation has the advantages of reducing the complexity of relations between inputs and outputs, and overcoming system non-linearity. In this method, they transform the analog circuit testing problem into a graph theory flow problem.

Problem Formulation. They choose which accessible output parameters to measure, in order to cover all circuit elements. Since an element can be covered by multiple parameters, they choose parameters that guarantee maximal coverage of every element. *Element coverage* is the minimum circuit element deviation that can be observed at a primary output parameter. An element is considered faulty if its value is out of its tolerance box. They compute the relative deviation of an element