

With all forms of parallel feedback it is found that as the feedback factor is increased, a critical value will be reached at which the amplification is zero and the attenuation of the stage is therefore infinite. This

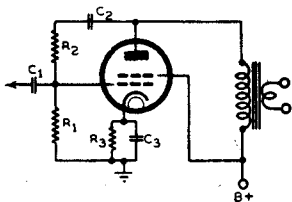


Figure 8

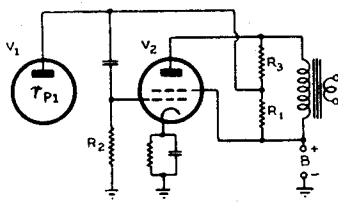


Figure 9

effect has been used for the purpose of attenuation, but is not normally encountered with practical amplifiers. The approximate formulae given for the feedback factor should be applied only for small values of feedback.

A particularly satisfactory arrangement is the Series Feedback Circuit (Fig. 10). In this, the feedback factor is

$$\frac{R_s}{R_s + R_L} \cdot \frac{R_2}{R_1 \left(\frac{R_2}{R_s + R_L} + 1 \right) + R_2}$$

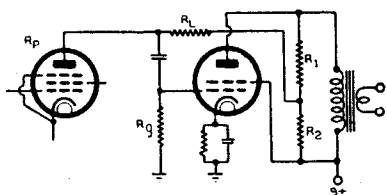


Figure 10

$$\text{where } R_s = \frac{r_p \cdot R_g}{r_p + R_g}$$

If $(R_s + R_L) \gg R_2$, as is generally the case, the feedback factor is approximately

$$\frac{R_s}{R_s + R_L} \cdot \frac{R_2}{R_1 + R_2}$$

The Series Feedback Circuit has been fully described elsewhere*.

All these methods of obtaining Negative Feedback with resistance coupling are best used with a pentode in the preceding stage. This is because

1. There is less shunting of the feedback voltage due to the plate resistance of this valve.
2. A pentode may be used with any value of load resistance without serious distortion, while a triode valve gives serious distortion when the load resistance is decreased much below the plate resistance; in the extreme case the triode may even reach plate current cutoff during part of the cycle and the distortion is then very distressing,
3. The gain of the pentode is inherently higher, so that an appreciable gain reduction still leaves a reasonable stage gain, whereas an additional stage may be required with triodes.

*Radiotronics 74 (31st March, 1937), p. 18. Radiotronics 81 (15th November, 1937), p. 87. Wireless World (17th November, 1938), pp. 437-438.