

Fig.9. Combined characteristic of transistor splitter and output circuit shows excellent gain linearity.

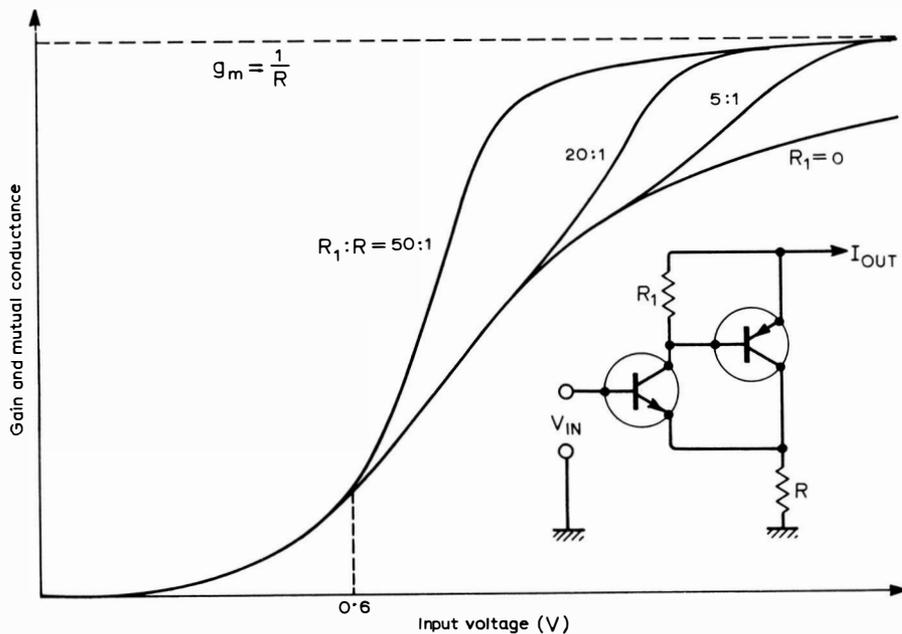


Fig.10. Transfer characteristic for conventional two-transistor sub-amplifier showing worsening effect of reducing the base-emitter 'turn-off' resistance of the power transistor. This normally generates 'dead zone' distortion due to the change in slope at zero crossing but is avoided in the new approach.

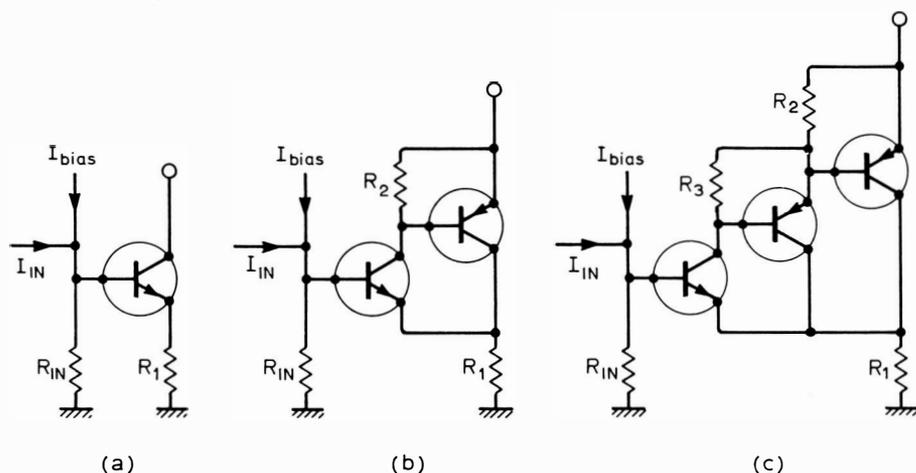


Fig.11. (a) Change in V_{BE} with temperature causes considerable change in bias current which could adversely affect intermodulation distortion. Circuits in (b) and (c) avoid this.

increase in distortion at low frequencies which could adversely affect the inter-modulation performance of the amplifier as a whole. An improved design is shown in Fig. 11(b) and a more elegant version similar to that used in the Quad amplifier⁶, in Fig. 11(c). It is on this latter example that I have concentrated most design effort, mainly because the performance advantages tend to outweigh the increased cost of pre-driver devices.

Returning now to an examination of the performance of the whole amplifier—the total distortion through the audio range can readily be made less than 0.1% before applying feedback, this performance being repeatable at almost any level of quiescent current.

Future designs

The use of class B amplifiers is not, of course, confined to the field of audio and in fact the ideas set out in this article lend themselves to applications in the high-frequency (> 1MHz) spectrum. The poor cross-modulation performance of present designs is usually due to the presence of non-linearities in the crossover region, hence substantial improvements can be expected in this direction.

Other applications where an ultra-low distortion amplifier of low stand-by power and high output capability is needed can be seen, examples of such devices being portable standard oscillators and meter calibration amplifiers. In the next article a practical design for a 30-watt audio amplifier is discussed in detail and future proposals developed in diagrammatic form.

(To be concluded)

REFERENCES

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Our 60th Birthday

The first issue of this journal, which for two years was entitled *The Marconigraph*, appeared in April 1911 and we therefore celebrate our 60th birthday this year. To mark the occasion we plan to have an enlarged April issue including several contributions reviewing the past 60 years in various fields. Further details will be given in our next issue.