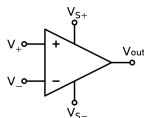


The Benefits of Negative Feedback: The Op Amp

1927: Harold S. Black of Bell Labs developed **negative feedback amplifier** to reduce signal distortion in long-distance telephony.

I suddenly realized that if I fed the amplifier output back to the input, in reverse phase, and kept the device from oscillating ..., I would have exactly what I wanted: a means of canceling out the distortion in the output. ... By building an amplifier whose gain is deliberately made ... higher than necessary and then feeding the output back on the input in such a way as to throw away the excess gain, it had been found possible to effect extraordinary improvement in constancy of amplification and freedom from non-linearity.



Curious fact: it took **nine years** (!) for Black's patent to be granted because the patent officers refused to believe that the amplifier could work.