OTA Applications

OTA use in Realisation of Active Filters

Continous (Analog) Filters are mostly used in cases which have lower cut-off.

For example a RC filter is a Passive Continous Filter. The cut-off frequency is function of RC time constant. For higher frequency cutoffs, one must get v.small values of R and C. R realisation on Silicon has limits of getting extreme value of R (larger & v.smaller).

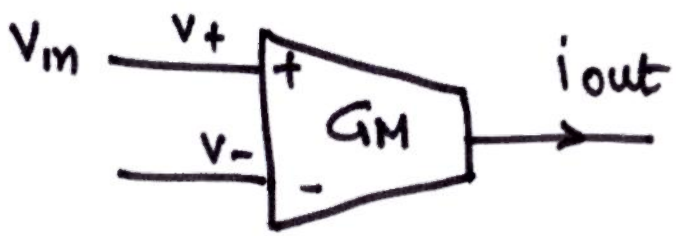
Thus frequency response of Filters are limited bandwidths one.

On Silicon an Active filter can satisfy both Input-output relations by realising Resistors by $1/g_m$ values.

Such filters are also called g_m-C continuous filters.

OTA is a device, whose output could be controlled 'transconductance'.

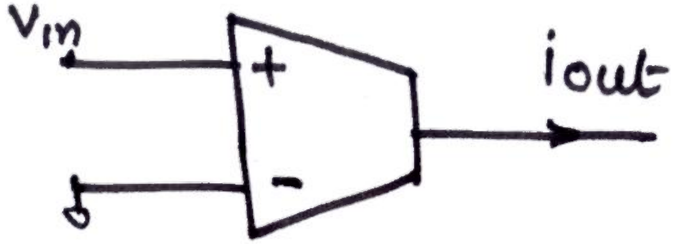
Take an OTA as shown



$$i_{out} = G_M \cdot (V_+ - V_-)$$

If we put $V_- = 0$

Then $i_{out} = G_M \cdot V_{in}$



$G_m = g_{m_1}$

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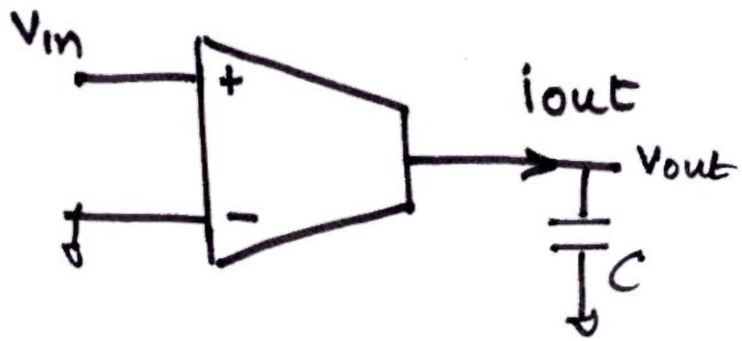
$i_{out} = g_{m_1} V_{in}$



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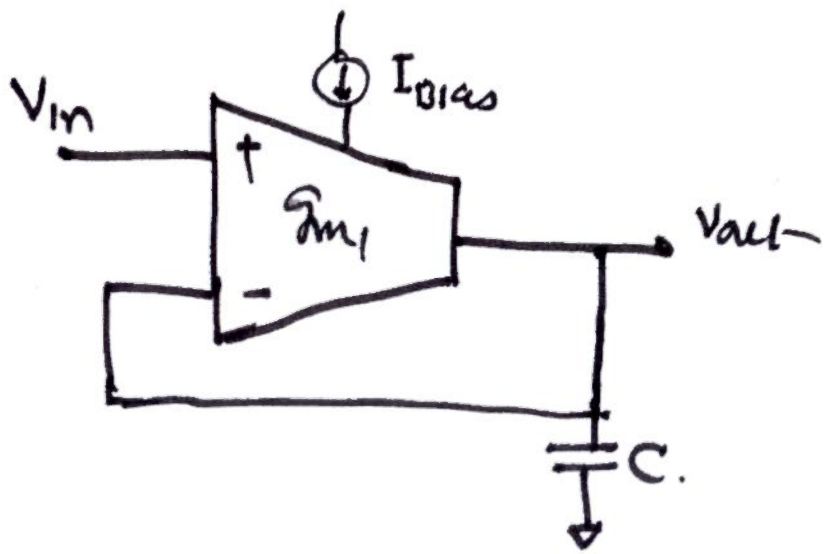
$V_{out} = i_{out} / j\omega C$



Loaded with -ve feedback