Tutorial -

1) A feedback amplifier has a voltage gain of 500 without feedback. Determine the voltage gain with feedback if feedback ratio = 0.1

$$A_f = \frac{A}{1+A\beta} = \underline{\underline{9.8}}$$

2) In a negative feedback amplifier $A = 100$, $\beta = 0.02$ & i/p signal voltage is 40mV. Determine (i) voltage gain with feedback (ii) feedback factor (iii) feedback voltage (26.66mV) & (iv) o/p voltage. (1.33V)

Sol: Given $A = 100$ $\beta = 0.02$

$V_s = 40mV$

(i) $\Rightarrow A_f = \frac{A}{1+A\beta} = \underline{\underline{33.33}}$

(ii) $\Rightarrow A\beta = 100 \times 0.02 = \underline{\underline{2}}$

$\beta = 0.02 = 2\%$

(iii) $\Rightarrow V_f = \beta V_o \Rightarrow 26.66mV$

(iv) $\Rightarrow V_o = A_f \cdot V_{in} = 33.33 \times 40mV = 1.33V$.

3) An Amplifier has gain of 60 & distortion 10% without feedback. Determine (1) closed loop gain, (2) Distortion when a negative feedback is ~~applied~~ applied to feedback factor being $\frac{6}{}$

Sol: $A = 60$ $D = 10\% = 0.1$

$$A_f = \frac{A}{1+A\beta} = 8.57$$

$$D_f = \frac{D}{1+A\beta} = 1.42\%$$

4) An Amplifier has midband gain of 200 without feedback. The 3 dB freq width of it is 200k. the amplifier is to be used as a video amplifier that requires 5MHz bandwidth. what gain can be obtained & what feedback must be used? what bandwidth could be obtained if the feedback were 100%.

Sol $A_V = 200$ $BW_f = 5MHz$ $BW = 200k$

$$BW_f = (1+A\beta)\,BW$$

$$\beta = \left(\frac{BW_f}{BW} - 1\right)\frac{1}{A} = 0.12$$

$$A_f = \frac{A}{1+A\beta} = 8$$

if $\beta = 100\% = 1$

$$BW_f = (1+A\beta)\,BW = 40.2MHz$$