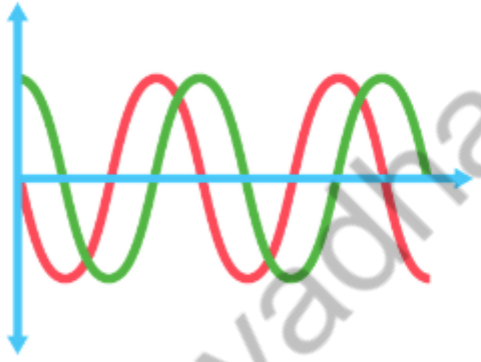
Course: Advanced Analog IC Design



Lecture 3: Linearity Measurement

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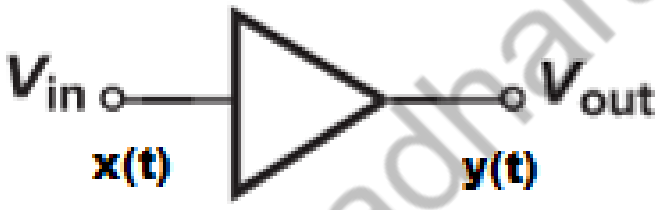
Linearity

The network is linear and memoryless if out put is defined as :

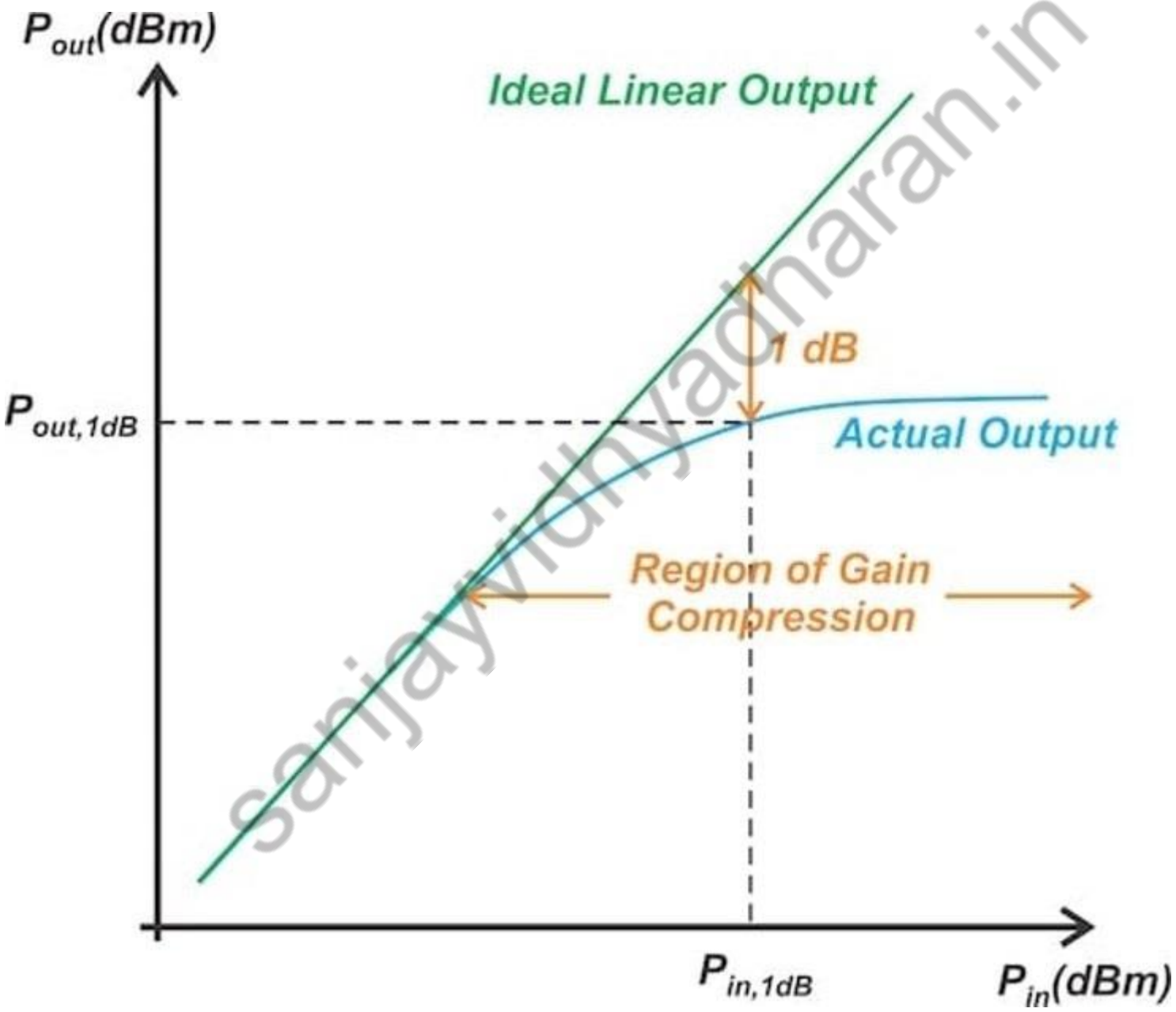


$$y(t) = \alpha_1 x(t)$$

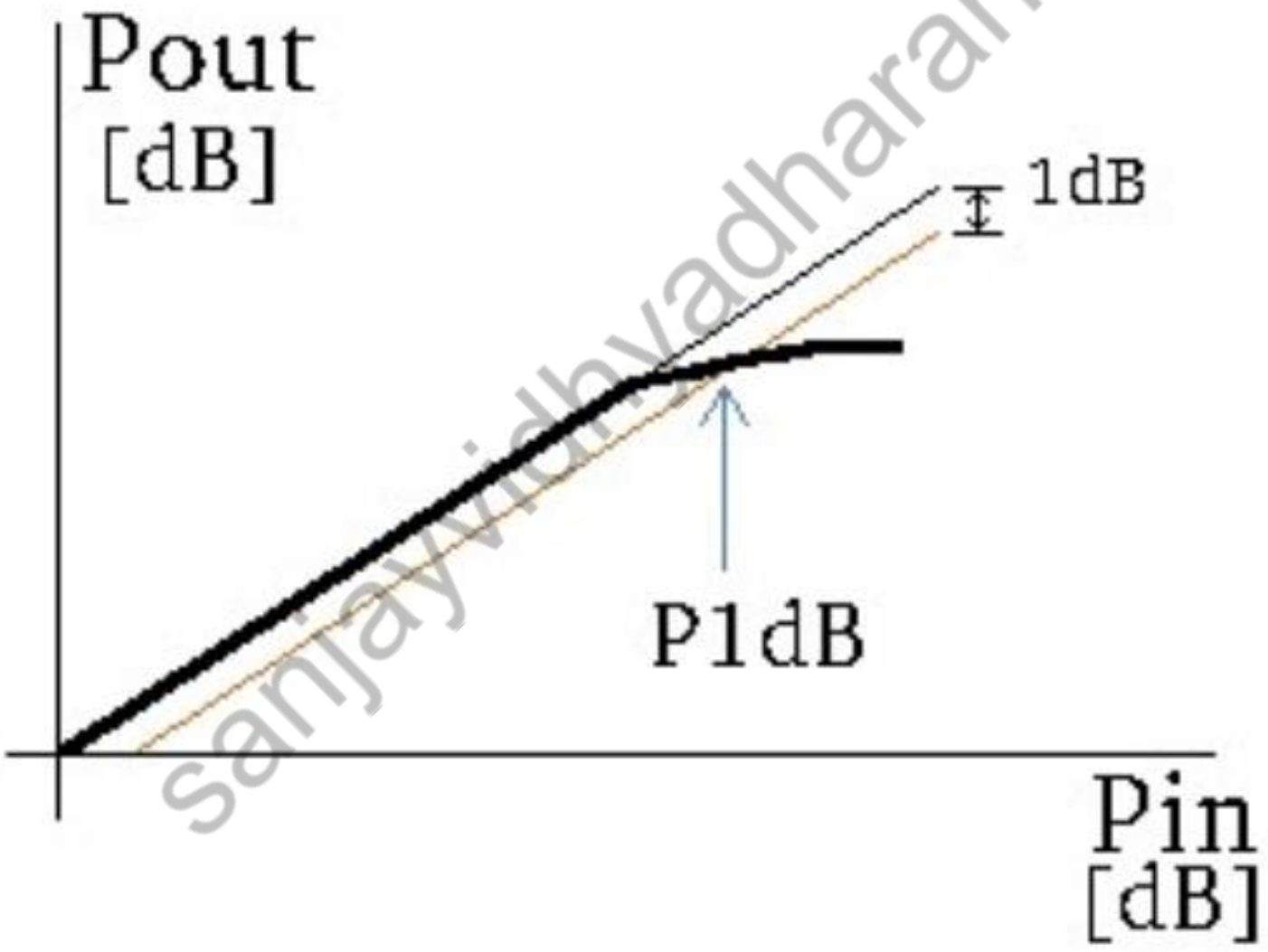
and Non-Linear if out put is defined as :

$$y(t) \approx \alpha_0 + \alpha_1 x(t) + \alpha_2 x^2(t) + \alpha_3 x^3(t) + \alpha_4 x^4(t) + \ldots$$

1 dB Compression Point

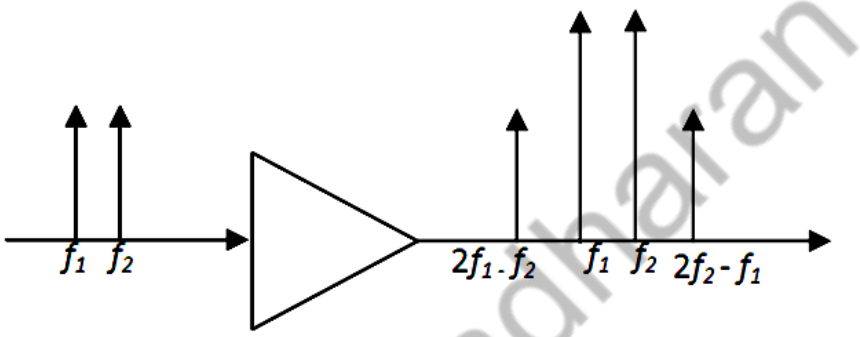


1 dB Compression Point

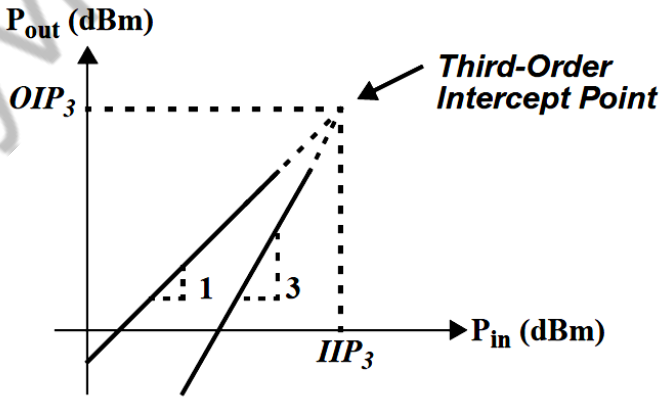


Third-order Intercept Point (IP3)

$$y(t) \approx \alpha_0 + \alpha_1 x(t) + \alpha_2 x^2(t) + \alpha_3 x^3(t) + \alpha_4 x^4(t) + \ldots$$



They grow at a rate of 3 dB for every 1 dB of increase in input power level. The desired signal grows at a rate of 1 dB for each dB of input power.



Example
f1= 10 K and f2=10.1K
Third order hormonic 20K-10.1 K = 9.9K
First order we set f2=10.1K

Thank you