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## Compression Modeling in SysCalc

SysCalc models compression using the following formula.

$$P_{out} = \frac{10}{n} \log\left(\frac{B}{B+1}\right) + P_{sat}$$

$$\text{where, } B = 10^{\frac{n(P_{in} - P_{sat} + Gain)}{10}}$$

The general characteristics of this formula are similar to a High-Pass Filter. In the extremes,

$$B \gg 1, P_{out} = P_{sat} \quad // \text{ saturation}$$

$$B \ll 1, P_{out} = P_{in} + Gain \quad // \text{ Linear gain}$$

The factor,  $n$ , determines the “quickness” with which the output power saturates and uniquely relates  $P_{1dB}$  and  $P_{sat}$ . The factor,  $n$ , becomes larger as  $P_{1dB}$  and  $P_{sat}$  get closer in value. The following range applies:

$$1.5 < P_{sat} - P_{1dB} < 9 \text{ (dB)}$$