dB
dB

• "dB" are a relative measure and can make sense only in relation to another level.
• Saying "the level of this signal is 5 dB" is similar to saying "the cost of this candy bar is 5 cents more."
• When judging the response of your filter(s), measure them in relation to a good reference level (e.g., near DC or pi); the absolute level does not matter.
  – Be careful if your input signal does not have a flat spectrum at the reference point
Consider two signals: $x$ and $y$ and suppose $x$ is 10x larger in magnitude than $y$

*Power* = voltage$^2$ / resistance, so $P_x$ is 100x larger than $P_y$

“Magnitude” dB
- $20 \log_{10} \left( \frac{x}{y} \right)$
- $20 \log_{10} \left( \frac{10y}{y} \right) = 20 \log_{10} (10) = x$ is 20dB larger than $y$

“Power” dB
- $10 \log_{10} \left( \frac{P_x}{P_y} \right)$
- $10 \log_{10} \left( \frac{100P_y}{P_y} \right) = 10 \log_{10} (100) = x$ is 20dB larger than $y$