**Project Report**

Random Signal and Noise

Optimal Non-uniform Quantizer

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**Figures:**

1. **Scale Parameter of “0.5”**

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**2-Scale Parameter of “2”**

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**3-Comparison Between Scale Parameter of “0.5” and “2”**

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**3-Quantizer at Scale Parameter of “0.5” and “2”**

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**Observation:**

The scale parameter value affects the spreading of the pdf from the mean point (reference point), where high scale parameters mean higher scattering of the **pdf** (Probability Density Function) values around the mean.

A high scale parameter value increases **SQNR** (Signal to Quantization Noise Ratio) against the number of quantization levels.

Upon plotting the SQNR at scale parameter of 0.5, the **SQNR** values saturated after certain number of levels, where increasing the representation levels did not result in better **SQNR**.

**Conclusion:**

In conclusion, the more scattered the **pdf** around the mean the easier to quantize, hence less distortion and higher **SQNR** results.