



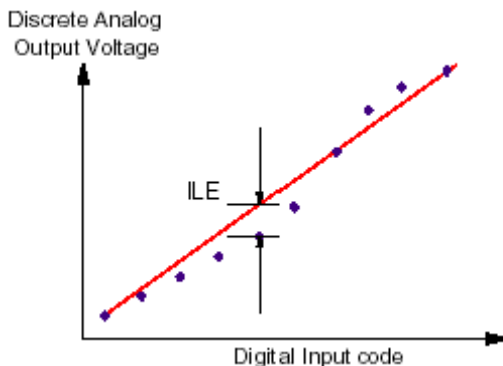
Question: "There are several ways to calculate Integral Non-Linearity (INL); would you please explain the different methods?"

Question:

I am currently programming the DAC test program and heard there are several ways to calculate Integral Non-Linearity (INL); would you please explain the different methods? (Junior Test Engineering of V Company)

Answer from Don Blair:

The Integral Non-Linearity (INL) or Integral Linearity Error (ILE) is the one of the most important static characteristics of the data converters (DAC/ADC). The INL is the deviation of each analog level from a calculated straight line that means the ideal linearity after offset error and gain error are removed.



In general, ILE has three different types. They are:

- End-Points ILE
- Best-Line (Independent, RMS) ILE
- Zero-Based ILE

The differences of types are how you calculate the ideal straight line.

The End-Points ILE is the deviation of each analog level from the ideal straight line that passes through the end points of the DAC output. This type is mostly used because of easy calculation.

Best-Line ILE is the deviation of each analog level from the ideal straight line that minimizes the peak deviation from the ideal straight line using the Least Square Low. This type has the best ILE value.

Zero-Based ILE is the deviation of each analog level from the ideal straight line that passes through the middle point (zero-point) and minimizes the peak deviation from the

ideal straight line. This type is used when the linearity at the middle point (zero-point) area is important.

