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**Variable length data formats**

The purpose of this paper is to discuss a number of variable length floating point and integer formats and to give the various advantages and disadvantages of their use. Often it is known in advance that a given integer will not exceed a certain magnitude or that a particular floating point number is accurate to only 'n' places of accuracy. Faced with this, it is good engineering to choose variable length floating point and integer formats which require the least amount of hardware or the minimum amount of software or which have some other dominant advantage. The formats discussed have the advantage that length change algorithms are invariant with respect to data types (unsigned, signed, floating point, integers, and complex numbers). The STARAN associative array processor, which uses a completely variable fixed point and floating point formats, is described.

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The query refers to a specific paper titled "Variable length data formats" that was presented at the Data Management Symposium in Huntsville, Alabama, in October 1977. The paper, which appeared in the conference proceedings on pages 243-253, discusses several types of variable-length formats for floating-point and integer data.

**The paper's context and purpose**

**Engineering trade-offs:** The paper addresses the practical engineering problem of choosing data formats. It assumes that developers often have prior knowledge of the data they will be storing, such as an integer's maximum possible magnitude or a floating-point number's required precision. Given this knowledge, the goal is to choose a variable-length format that minimizes software or hardware complexity.

**Format properties:** It outlines the advantages and disadvantages of different variable-length formats. A key feature of the discussed formats is that their length-changing algorithms are designed to be invariant across different data types, such as signed and unsigned integers, floating-point numbers, and complex numbers.

**Real-world application:** The paper references the STARAN associative array processor, which implemented fully variable fixed-point and floating-point formats, as a specific example.