

## Re: how to find the best ADC step size?

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**From:** Clay S. Turner (*Physics\_at\_Bellsouth.net*)

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"Randy Yates" <randy.yates@sonyericsson.com> wrote in message  
news:xxp1lbqjpf.fsf@usrts005.corpusers.net...

> "Clay S. Turner" <Physics@Bellsouth.net> writes:

>> [...]

>> *The idea is to try to make each symbol contribute equally to the overall  
>> process. Imagine looking at your data after a huge number of symbols was  
>> received. The idea is to make the info provided by each type of symbol  
>> contribute equally.*

>

> *But this Huffman coding won't do that. Choosing a representation for a  
> symbol doesn't change the probability of the symbol occurring. It  
> does, however, minimize the average symbol rate – I certainly see  
> that. Perhaps I'm being blind?*

> --

Hello Randy,

The Huffman problem and the quantization problem are related in they both implement methods to effectively flatten out variations. True they are different in that the Huffman problem is trying to minimize the average number of bits per sample and the quantization problem is trying to maximize the information per sample. The differences arise from the constraints and what you are starting with. In one case we have a fixed amount of information, so how few total bits can we fit all of the info in. The theoretical answer is the entropy, but the practical answer (comes from requiring whole numbers of bits in a symbol is the Huffman entropy.) In the other case we have a fixed symbol size, so how can we get the most info per symbol. The connection is the entropy and its maximization requires a flat distribution.

In Huffman coding we sort the symbol probabilities into descending order and then we make multiple passes through the list each time combining the two lowest probabilities together. So we are essentially trying to make each path's probability be the same or at least similar. In the quantization we are just dividing up the total probability into N equal regions.

You are not being blind, you are just asking how two seemingly different

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things are related. And the relation is through a flattening out of the probability function.

I hope this helps to clear some things up.

Clay