Re: Poles an Zeros

Source: http://sci.tech−archive.net/Archive/sci.electronics.basics/2008−02/msg00855.html

- *From*: whit3rd <whit3rd@xxxxxxxxx>
- *Date*: Fri, 29 Feb 2008 10:16:49 −0800 (PST)

On Feb 29, 8:27 am, John Larkin
<jjlar...@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx> wrote:

> On Thu, 28 Feb 2008 19:14:25 −0800 (PST), Rob <r...@xxxxxx> wrote:
>
> > Could someone explain to me Poles and Zeros.
>
> If you have a box with an input and an output, with linear response,
> there exists a mathematical expression, a transfer function, that
> describes how it behaves. If you know the transfer function, then for
> any input signal you can predict the output.
>
> There are many ways to express the transfer function, most of them
> mathematically messy. Engineers prefer the Laplace Transform, which
> expresses the transfer function as a polynomial, using the complex
> varible "S". You'll have to read up on the theory to understand what S
> really is.
>
> But if you express a transfer function as a polynomial on S, and
> factor it out nicely, and sweep S, the polynomial has "zeroes" where
> the numerator hits zero, and "poles" where the denominator hits zero.

Just to fill in another detail: if one sets up the known conditions
for a
network of electrical components, the result is a set of simple linear
equations. Solving the simultaneous equations will (at worst) result
in
an expression which can be simplified to a ratio of two polynomials in
S,
and the factoring of those polynomials is in general going to result
in the numerator having zeroes (the zeroes of the ratio) and the
denominator

having zeroes (the poles of the ratio). The poles and zeroes express ALL of the resulting expression except for a single scaling constant.

The handling of a messy expression then is simplified to the values of some key numbers (the poles and zeroes).

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