

Thinking Socializing in the view of Electric Circuit Reflection

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Today I'm going to talk about, "reflection". What do you imagine when you hear "reflection?" When I was around ten or eleven years old, I associated it with a mirror or barrier which appeared in animations or movies. Now, however, I relate reflection to an electric circuit.

There are several types of reflection. As far as I'm concerned, it is hard for most people to imagine what kind of reflection is found in society. I would like to give you some examples.

Today, the Internet has become so widespread that there is no one who is not benefiting from it. Optical fibers are used for communication by relaying the internet to us. In optical fiber, when light passes through a cord made of plastic or glass, the light does not leak out because the transparent core and the surrounding material are different. The important thing here is the difference of refractive indices between the two materials. If the refractive indices are equal, it is the same as if the light is passing through the same material like glass to glass or water to water, so the light is not reflected.

The next technology using reflection is TDR. TDR is a word that many of you may have never heard before. Some of you may also associate it with Tokyo Disney Resort. However, the TDR I am talking about is "Time Domain Reflectometry", which is used to identify where power lines have been cut by falling trees. Without this technique, we need numerous people to waste a lot of time.

Why is it now possible to identify that place so easily? The reason is that the resistance of the broken part is completely different from the connected part. If you apply a rapidly changing voltage, pulse waves will travel down the line and reflect at the broken point, just like ripples on the water. By measuring the time from input until the pulse returns, we can determine where the wire was cut.

Further development of TDR is used in more micro-sized circuits. This method can identify what is there. When a tetragon pulse is an input, a resistor will produce the same tetragon waveform, a capacitor will produce a waveform that falls once and rises slowly, and a coil will produce a waveform that rises once and falls slowly. This makes it possible to estimate the contents of a black box by inputting a pulse and analyzing the reflected waveform.

What is important here is that the reflection in electronic circuits is similar to the light, and the difference in reflected waveform differs depending on what kind of object

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it encounters.

In addition to the well-known meaning of reflection, reflection in the dictionary also has the meaning of "a thought, idea, or opinion formed, or a remark made as a result of meditation. When you are interacting with someone, your own actions result in a reflection from the other person. Relations between you and I are a repetition of reflection. In the same manner as an electric circuit, reactions are different for each person because their characteristics are not the same. So, you should analyze it and think deeply about what is in their mind. Through this process, you can understand them more deeply and strongly.

If you are majoring in technology and can understand the feelings of electric circuits better than the feelings of people, like myself, why don't you try to imagine your social relationships based on the reflections of electric circuits?