IMPORTANT ROLE OF POPULARISATION OF PHYSICAL SCIENCE TO THE MODERN BUSINESS ACTIVITY

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ABSTRACT

Recent development of science and technology enables us to have enormous possibility of high quality of life and also gives us big business chance. But we should not forget that there exist many consumers behind the markets and all consumers do not always have enough ability to accept the high level consumption. Physics is one of the most necessary and basic knowledge to have the ability, because the physical concepts are frequently used in various high-level products. Though many people believe that it is quite hard to get the knowledge of physics, recent development of computer techniques in graphics and animation is quite helpful for the easy understanding of physics. It is also necessary that we, physicists select and educate the minimum basic knowledge of physics called as “physics minimum" to communicate with the specialists. In this work, we discuss about the methods of the education to average citizens by use of animation techniques and show an example of selection of the physics minimum.

1. INTRODUCTION

Recently, interest in the citizens to the physical science seems to be lower and lower in the developed countries. Such a tendency is found not only in average citizens, but also in some economic and political leaders. However, considering important roles of physical knowledge to other scientific and technical fields, we, physicists feel that such a tendency is completely unprovoked. Even in bioscience, some highly measurement systems such as Magnetic Resonance Imaging (MRI) are based on high level techniques and knowledge of physics is required to make a progressive use. We also want to mention that wide scientific knowledge is always required when new original projects are planned in the enterprises [1,2]. Generally speaking, as the product has more attractive originality, so the bigger business profit can be expected. Moreover, the matching between ability of the market and degree of class for the product is the important condition to success the business plan. Thus, we hope that the leaders have more interest in education and cultivation of the basic science to the community. Such educated people will have excellent potential in consumption, which contribute to the

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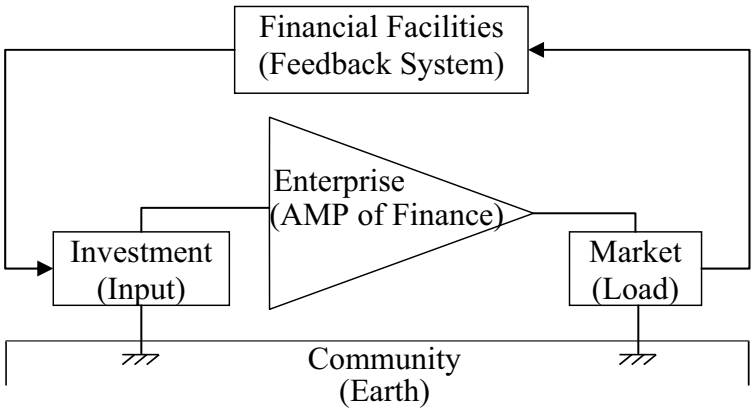

Fig. 1. Schematic diagram of economic facilities and their mutual relations. These functions of the economic facilities resemble with the functions in electronic circuit. The parenthetic words in the figure correspond to the technical terms used in usual electronic circuit.

proceeding of production in next stage. On these backgrounds, here we will discuss a method to popularise the basic and essential concepts in physics to the modern business activity.

2. METHODS AND DISCUSSION

Physics of materials is one of the main research fields in physics alongside of Astro- and Particle- physics. Especially, knowledge of materials physics has been frequently applied to the industry and the philosophy of the materials physics gives us some tough scientific back-up against the problems. Even if the problem is complicated system, such as economic system, the physics can suggest us some suitable way on some appropriate modelling. In the materials physics, time dependence of the energy flow in the system having various functions is the most basic physical description. Such phenomena are quite common not only in physical system, but also in other various systems. We want to mention that this kind of phenomena of energy flow can be described by electronic circuit model. The economy system is schematically shown in Fig. 1 on the energy flow model. The economy system can be understood as a problem in energy-articles transformation in economy system. In order to form the big economy, consumers should make effort to enhance their ability of acceptance to the products under the harmonious balance of power among the economical facilities. Thus, we choose the circuit model as the 1st item of physics minimum.

Beside the 1st item, we will choose that thermal physics is second one, such as shown in Fig. 2, which can describe typical concept of thermal phenomena related to the law of energy flow in materials. Third item is, so called Fourier Transformation (FFT), which is the typical mathematical tool to represent any figure by well-known systematic function system (Fig. 3). Because the philosophy of the FFT is not familiar for citizen, the concept should be educated by animation method. By using these three items as the physics minimum, the sense of treatment of energy flow among various functions under the rule of energy transfer and ability of discussion on the time

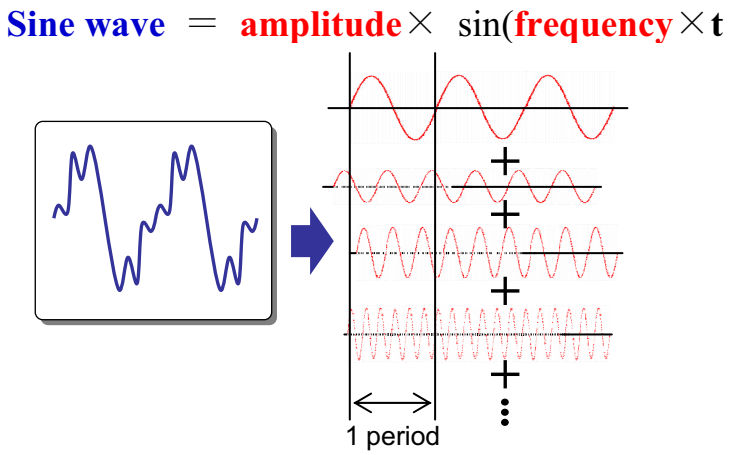

Fig. 2. Schematic diagram of Principle of Fourier transformation. All waves are able to be resolve into simple waves such as sine waves.

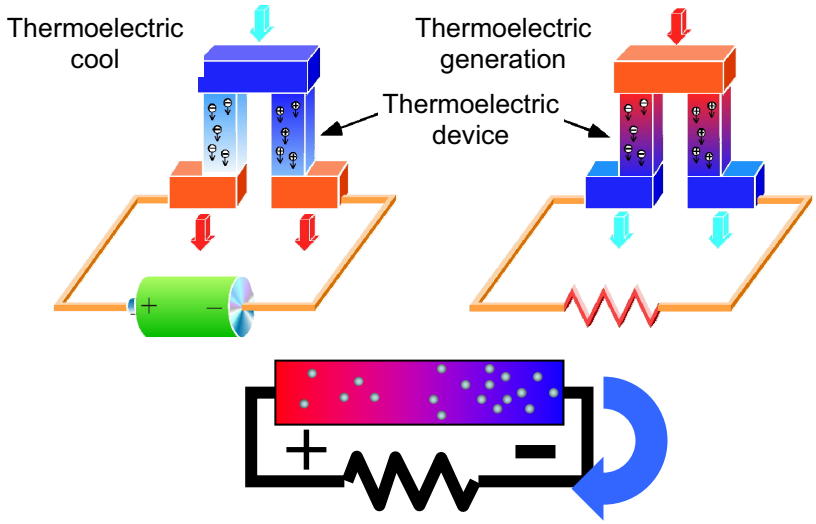

Fig. 3. Schematic diagram of thermoelectric cool and generation system. A thermoelectric device can cool using battery and also generate voltage with temperature difference.

dependent data or figures should be trained, because solutions of every physical equation is given by the time dependence of the spatial figures.

In the education of physics, professors usually require tough and long patient training, so far, however, recent computer animation techniques gives us revolutionary improvement to the education. Such a method is quite helpful to understand the points on physical concepts. In fact, our special investigation in COE program in JAIST makes us experience the quite positive effect of the representation. Thus, the animation method is quite useful to popularize the physics to the citizens. It is really required that presenters can easily make the animation representation by himself along his idea.

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