Building a program of university physics and mathematics education

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Recently, readiness of students to learn university science and engineering is diversified. It is sometimes necessary to teach mathematics and physics of elementary and secondary education at college. In Japan, after admission to universities the paradigm of learning often converts. Therefore, in earlier term after admission, it is very important for each teacher to provide learning readiness to each student.

To this end, authors built physics learning modules (Table 1) which consist of lectures, experiments and practices, introducing physics experiments of elementary and secondary education[1]. On the other hand, we are operating "KIT Mathematics Navigation" in order to complement mathematical basics to engineering education[2].

Based on these results, we built studies and development of an education program in order to support the learning paradigm shift and to learn physics and mathematics complimentarily for liberal arts education course in universities.


\begin{table}[h]
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\textbf{Physics learning modules} \\
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01. Number, quantities, and units \\
02. Composition of motions \\
03. Composition of forces \\
04. Equilibrium of forces \\
05. Newton’s laws of motion \\
06. Impulse and momentum \\
07. Work and Energy \\
08. Fluid statics \\
09. Fluid dynamics \\
10. Heat and temperature \\
11. Boyle-charles’ law \\
12. The first law of thermodynamics \\
13. Thermodynamic processes of gases \\
14. Elastic bodies \\
15. Rotational motion \\
16. Dynamics of mass-system and rigid bodies \\
17. Simple oscillation and sine wave \\
18. The nature of waves \\
19. The nature of light \\
20. Electric charge and electric field \\
21. Capacitors \\
22. Direct-current circuits \\
23. Magnetic field of currents \\
24. Lorentz force and electromagnetic induction \\
25. Alternating current \\
26. Electromagnetic waves \\
27. Atomic structure \\
28. Wave-Particle Duality \\
29. Atomic nucleus and radiation \\
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