

New types of problems – what are they and how to design them

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Abstract. Traditional physics problems in introductory physics textbooks normally ask for a specific numerical value while giving all necessary data (but not more) and making all simplifying assumptions that are needed to find the solution. Students often solve this kind of problems by searching for an equation in which they insert given numbers not thinking about the underlying physical concepts and the validity and/or suitability of assumed mathematical models. Doing this the students cannot develop higher level thinking skills, conceptual understanding, and problem solving strategies that are characteristic for experts and commonly expected in the era of fast technological development and a rapidly changing world. In my talk, I will discuss some non-traditional types of problems and the benefits of those problems compared to traditional problems on the same physical topic. I will share some experience in designing such problems and piloting them with students.