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Mathematics and its connections with technical subjects, the real world and professional life

This paper will offer an analysis from a theoretical point of view of mathematical modelling and its applications. We will also analyse the inverse problems, of both causation and specification types. After that, experiences from courses taught over the past 15 years will be described and analysed. A separate section will briefly describe a particular experience carried out with former students, dealing with problems arising from the industrial sector. On the basis of this experience, the characteristics of real-world problems will be defined. Finally, several results will be presented and some conclusions proposed.