

A Tutorial on Mathematical Models in Materials Science

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“The most incomprehensible thing about this universe is that it is comprehensible”

Albert Einstein

Abstract: Materials Science (*MS*) broadly concerns with the nature, properties, and use of materials. It accompanies mankind from the very beginning of its existence. The *MS* investigates the effect of the structure in various scales on materials properties. Mathematical Models (*M&M*) is a routine part of materials science research and development. It is appropriate to understand how and if modelling differs from ordinary quantitative science and to assess the successes and failures of the methods. *M&M* plays a key role in ensuring the success of innovative systems, which meet existing needs or introduce new standards, by disrupting the status quo. The subject is now sufficiently mature to bear some constructive self-criticism and exaggerated claims. The paper discusses various aspects of *M&M* and outcomes are intended to be generic, although the examples used come from the various aspects of metals.

Keywords: Idea, product, model, modelling, validation, material properties, and development