

Editorial

Differential Equations with Applications to Industry

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This special issue is focused on the application of differential equations to industrial mathematics. Of particular interest is the role played by industrial mathematics in the development of new ideas and applications. We are particularly interested in industrial mathematics problems that come from industrial mathematics study group meetings, which take place regularly at universities across the world. These study group meetings are motivated by solving real-world problems that are posed by industry representatives at the start of the meeting. Graduate students and academics then spend one week developing mathematical models that simulate the problems presented. These mathematical models are then solved (usually after some simplification), and conclusions relevant to the real-world problem are made.

This special issue contains a paper that is based on a problem presented by the coal mining industry in South Africa at an industrial mathematics study group meeting. In the paper, the author considers the possible collapse of the roof between the pillar to be mined next in secondary coal mining and the first line of pillar remnants called snooks. Here, the Euler-Bernoulli beam equation is used to model the roof rock between the pillars, which is the working face between two pillars. The model predicts that the beam will break at the clamped end at the pillar. The failure of the beam for different values of the physical parameters is investigated computationally.

Many industrial mathematics problems contain an aspect of heat conduction. This special issue contains a paper in which a new error measure is proposed for the heat balance