Combustion waves in porous media with thermal losses

Grigori Chapiro[1]

[1] Universidade Federal de Juiz de Fora, Juiz de Fora, Brazil

Some analytic studies on filtration combustion will be presented. We will consider mathematical models describing the phenomenon in different physical configurations. Some examples that will be considered: the existence and uniqueness of solutions was considered for combustion in foams [2] and in porous media [3], taking into account the thermal losses [1]. The models are composed of Partial Differential Equations (Balance Laws). The corresponding Riemann Problem solutions are presented as a sequences of contact waves and traveling waves. Analytic estimates are validated through numerical simulations using Finite Element Method [4].

References

[1] G. C. and D. Marchesin, *The effect of thermal losses on traveling waves for in-situ combustion in porous medium*, Journal of Physics: Conference Series, v. 633, p. 012098-12101, 2015.

[2] G.C., D. Marchesin, S. Schecter. *Combustion waves and Riemann solutions in light porous foam*, Journal of Hyperbolic Differential Equations, 11:295-328, 2014.

[3] Ozbag, F., S. Schecter and C.G. *Traveling waves in a simplified gas-solid combustion model in porous media*, Advances in Differencial Equations, 23(5/6):409-454, 2018.

[4] Pereira, S. W., and C. G., *Numerical Validation of Analytical Estimates for Propagation of Thermal Waves Generated by Gas-Solid Combustion*, Geofluids, 2017.