Chapter 6
Final Remarks

This book presented, in a self-contained fashion, a series of studies on flow and heat transfer in porous media, in which distinct energy balances are considered for the porous matrix and for the permeating fluid. Detailed mathematical modeling was presented considering both volume and time averaging operators simultaneously applied to the governing equations [1–3]. System involving combustion in the gaseous phase [4–6], moving beds [7, 8] and double-diffusion mechanism [9] are analyzed. Numerical results where presented for each case.

A correlation for interstitial heat transfer was obtained by resolving flow and heat transfer at the pore scale. After numerically integrating the distributed results in a unit cell, a macroscopic model considering the Local Thermal Non-Equilibrium hypotheses (**LTNE**) was presented.

Future work may take into consideration practical numerical results using the combination of a two energy equation model including double diffusion effects, which was presented only in theory in Chap. 5. By that, a more complete and more general model would be available contributing to solution of a broader range of problems, in a more realistic fashion, including simulation of modern equipment for gasification of renewable fuels and for advanced materials production. In the end, this book contains the description of a tool that might benefit engineers in developing and designing more efficient thermal equipment.

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