

Evaluation of Carbon Dioxide Pressure through Radial Velocity Difference in Arterial Blood Modeled by Drift Flux Model

Authors : Aicha Rima Cheniti, Hatem Besbes, Joseph Haggege, Christophe Sintès

Abstract : In this paper, we are interested to determine the carbon dioxide pressure in the arterial blood through radial velocity difference. The blood was modeled as a two phase mixture (an aqueous carbon dioxide solution with carbon dioxide gas) by Drift flux model and the Young-Laplace equation. The distributions of mixture velocities determined from the considered model permitted the calculation of the radial velocity distributions with different values of mean mixture pressure and the calculation of the mean carbon dioxide pressure knowing the mean mixture pressure. The radial velocity distributions are used to deduce a calculation method of the mean mixture pressure through the radial velocity difference between two positions which is measured by ultrasound. The mean carbon dioxide pressure is then deduced from the mean mixture pressure.

Keywords : mean carbon dioxide pressure, mean mixture pressure, mixture velocity, radial velocity difference

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