Capillary Pressure From Centrifuge —A New, Direct Method

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Abstract

Centrifuge data from short core samples can be interpreted by a direct, non-iterative method. For larger samples, the increase in centrifugal force along the core leads to a Volterra integral equation. Direct numerical solution methods are scarce, unless the data are forced into an assumed functional form of the capillary pressure curve.

This paper presents a method for solving the Volterra equation directly by a modified midpoint procedure, without iterations, numerical differentiation, curve fitting, or any assumed functional form. The method has been verified by comparison with other procedures, interpretation of artificially generated data, and by measuring the capillary pressure curves of the same nine cores with the three standard procedures.

The method is demonstrated on data from forced imbibition experiments. It is not overly sensitive to the number of datapoints, but a lower limit of 5-6 is suggested.