



US006351991B1

(12) **United States Patent**
Sinha

(10) **Patent No.:** **US 6,351,991 B1**
(45) **Date of Patent:** **Mar. 5, 2002**

(54) **DETERMINING STRESS PARAMETERS OF FORMATIONS FROM MULTI-MODE VELOCITY DATA**

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(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/588,934**

(22) **Filed:** **Jun. 5, 2000**

(51) **Int. Cl.⁷** **G01V 1/40; G01V 1/00; G01V 1/28; E21B 49/00**

(52) **U.S. Cl.** **73/152.01; 73/152.16; 73/597; 73/784; 367/27; 367/31; 367/86; 702/6; 702/11; 702/18**

(58) **Field of Search** **73/152.01, 152.16, 73/152.47, 783, 784, 804, 597, 587; 367/27, 31, 32, 75, 86, 25; 702/6, 11, 14, 18**

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(57) **ABSTRACT**

A method for determining unknown stress parameters in earth formation measures velocities in four sonic transmissions modes (compression, fast shear, slow shear and Stoneley) at a series of depths. Relationships between measured velocities and other measured values, two independent linear constants, and three nonlinear constants associated with equations of motion for pre-stressed isotropic materials are expressed in a set of four or five velocity difference equations derived from non-linear continuum mechanics. The velocity difference equations are solved using inversion for useful stress parameters, including maximum horizontal stress, minimum horizontal stress, pore pressure, and change in pore pressure over time.

15 Claims, 5 Drawing Sheets

