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RHEOLOGICAL EXPERIMENTS AND MODELLING OF STRUCTURAL BIOLOGICALLY FLUID (BLOOD)

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In this work, the viscoelastic behavior of blood in small-amplitude oscillatory, steady, and unsteady simple-shear flows and thixotropy effects are analyzed. Steady state flow show that blood behaves as a shear thinning fluid with a Newtonian plateau at high shear rate. In oscillatory flow, the empirical Cox-Merz rule is satisfied. On the other hand, spectrum of relaxation times is considered in the prediction of rheological properties to account for the association dynamics between structures inside the blood. Viscoelastic response is similar to the transient network assembled through erythrocytes, where the kinetic of chain breakage and reformations is consistent with the classical description of transient network formulations. The blood flow is analyzed with the Bautista-Manero-Puig model (BMP) constitutive equation, consisting in the Upper Convected Maxwell equation coupled to a kinetic equation to account for the breakdown and reformation of the fluid structure.