

# Existence of weak solutions to the equations of a non-Newtonian fluid with non standard growth

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We consider the equations of a non-Newtonian incompressible fluid in a general time space cylinder  $Q_T = \Omega \times (0, T) \subset \mathbb{R}^n \times \mathbb{R}, n \geq 2$ . We assume that the rheology of the fluid is changing with respect to time and space and satisfies for each  $(x, t) \in Q_T$  the associated power law  $|D|^{p(x,t)-2}D$ . Under the assumption that

$\frac{2n}{n+2} < p_0 \leq p(x, t) \leq p_1 < +\infty$  and the set of discontinuity of  $p$  is closed and of measure zero we show the existence of a weak solution to the corresponding equations of PDEs for any given initial velocity in  $L^2_\sigma(\Omega)$ .

*This is a joint work with Prof. H-O. Bae (Ajou University, Suwon).*