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Let  $D^\alpha$  denote the Riemann-Liouville fractional derivative. We are interested in studying the existence of positive solutions of the nonlinear fractional differential equation,

$$\begin{aligned}L(D)u &= f(x, u(x)), \quad 0 < x < 1, \\ u(0) &= 0, \quad u(1) = 0,\end{aligned}$$

where  $L(D) = D^{\alpha_2} - a_1 D^{\alpha_1}$ ,  $1 < \alpha_1 < \alpha_2 < 2$ , and  $a_1 > 0$ . (Received January 23, 2007)