Dear Editors of Mathematical Methods in the Applied Sciences,

I submit our manuscript(Entitled: A note on Liouville theorem for steady Q-tensor system of liquid crystal, Author: Ning-An Lai, Jiayan Wu) to you and for publication in Mathematical Methods in the Applied Sciences.

In this article, we study the steady-state solutions of the following Q-tensor model of liquid crystal in $\mathbb{R}^3$

$$\begin{cases} (u\cdot\nabla)u-\mu\Delta u+\nabla P=-\nabla\cdot(\nabla Q\odot\nabla Q)-\lambda\nabla\cdot(|Q|H) \\ \quad +\nabla\cdot(Q\Delta Q-\Delta QQ), \\ \nabla\cdot u=0, \\ (u\cdot\nabla)Q+Q\Omega-\Omega Q-\lambda|Q|D=\Gamma H, \end{cases} \tag{0.1}$$

we show that the steady Q tensor system (0.1) admits only trivial solution, i.e. $u=0, Q=0$ with the assumption that $u\in L^{\frac{9}{2},\infty}(\mathbb{R}^3)\cap\dot{H}(\mathbb{R}^3), Q\in H^2(\mathbb{R}^3)$ and $b^2-24ac\leq 0$, by using some properties of the Lorentz space. Hence we improve the result of Gong, Liu and Zhang (Applied Mathematics Letters, 76 (2018) 175-180) , in the sense that $L^p(\mathbb{R}^3)\subseteq L^{p,\infty}(\mathbb{R}^3),\ for\ 1\leq p<\infty$.

If you reach any decisions, could you kind enough to inform me. Thank you very much!

With Best Regards!

Jiayan Wu
School of Mathematical Sciences, Zhejiang University, Hangzhou 310027, China
The corresponding Email address: jiayanwu@zju.edu.cn