1145-15-2787 **Zhuo-Heng He** and **Jianzhen Liu*** (`lj445@medaille.edu`), 18 Agassiz Cir, Buffalo, NY 14214, and **Tin-Yau Tam** and **Qing-Wen Wang**. *A system coupled Sylvester-type tensor equations over quaternion and its applications.*

We consider the system of coupled Sylvester-type tensor equations $\mathcal{A}_i *_N \mathcal{X}_i - \mathcal{X}_{i+1} *_M \mathcal{B}_i = \mathcal{C}_i$, $(i = 1, 2, 3, 4)$ over the quaternion algebra, where the operation $*_N$ is the Einstein product, $\mathcal{A}_i, \mathcal{B}_i$, and $\mathcal{C}_i$ are given quaternion tensors with suitable order. We derive some necessary and sufficient conditions for the solvability of this system in terms of Moore-Penrose inverses of quaternion tensors, and provide an expression of the general solution to this system when it is solvable. As an application, we provide some necessary and sufficient conditions for the solvability and the expression of the general solution to the system of mixed pairs of Sylvester quaternion tensor equations $\mathcal{A}_1 *_N \mathcal{X} - \mathcal{Y} *_N \mathcal{B}_1 = \mathcal{C}_1$, $\mathcal{A}_2 *_N \mathcal{Y} - \mathcal{Z} *_N \mathcal{B}_2 = \mathcal{C}_2$, where $\mathcal{Z}$ is Hermitian. Some algorithms and numerical examples are presented to illustrate the results. (Received September 25, 2018)

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