fuzzy column matrix

Let B = [b_1 b_2 … b_m] where b_i ∈ [0, 1]; 1 ≤ i ≤ m, B will be known as the fuzzy column vector. Let B is a 5 × 1 fuzzy matrix. It is also know as the fuzzy column vector or fuzzy column matrix.

E = [0 0 … 0] will be know as the zero fuzzy row vector. Its is also known as the zero fuzzy column vector, will be known as the zero fuzzy column vector.

and X is the fuzzy row unit vector, will be known as the fuzzy column unit vector

$$B = \begin{bmatrix} 1 \\ 0.2 \\ 0.9 \\ 0.5 \\ 0 \end{bmatrix}_{5X1} \qquad E = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}_{4X1} \qquad X = [1\ 1\ \ldots\ 1]$$

Thus the unit fuzzy row vector and unit row vector are one and the same so is the zero fuzzy row vector and zero fuzzy column vector they are identical with the zero row vector and the zero column vector respectively.

Not:
the usual matrix addition of fuzzy matrices in general does not give a fuzzy matrix.

Clearly all entries in A + B are not in [0, 1]. Thus A (+) B is only a 3 × 3 matrix and is not a 3 × 3 fuzzy matrix.

On similar lines we see the product of two fuzzy matrices under usual matrix multiplication in general does not lead to a fuzzy matrix. This is evident from the following example

We see all the entries in A × B which will also be denoted by A(.) B are not in [0, 1] so A(.)B is not a fuzzy matrix. Thus under the usual multiplication the product of two fuzzy matrices in general need not yield a fuzzy matrix. So we are forced to find

EX:
Proof all entries in A (+) B & A(.)B are not in [0, 1].

$$A = \begin{bmatrix} 0.8 & 0.9 \\ 1 & 0.3 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 0.8 \\ 0 & 0.9 \end{bmatrix} \qquad \mathrm{A}(+)B = \begin{bmatrix} 1.8 & 1. \\ 1 & 1.2 \end{bmatrix}$$

$$A(.)\mathrm{B} = \begin{bmatrix} 0.8 + 0 & 0.64 + 0.81 \\ 1 + 0 & 0.8 + 0.27 \end{bmatrix} \qquad A(.)\mathrm{B} = \begin{bmatrix} 0.8 & 1.45 \\ 1 & 1.07 \end{bmatrix}$$