ODD-POWER IDENTITY VIA MULTIPLICATION OF CERTAIN MATRICES

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Abstract. In this manuscript, we show an odd-power identity in terms of certain matrix multiplication. More precisely, the matrix of dimension 1×1 such that $a_{1,1} = N^{2M+1}$ is result of multiplication of the three matrices $\mathbf{J}_N \times \mathbf{K}_{N,M} \times \mathbf{T}_M$

$$\begin{bmatrix} N^{2M+1} \end{bmatrix} = \mathbf{J}_N \times \mathbf{K}_{N,M} \times \mathbf{T}_M$$

where $\mathbf{J}_N$ is unit row vector of dimension $1 \times N$; $\mathbf{K}_{N,M}$ is a matrix of dimension $N \times M$, and $\mathbf{T}_M$ is a column vector of size $M \times 1$.

Contents

Definitions

- $\mathbf{J}_N$ – unit row vector of all 1's having the dimension $1 \times N$. For example,

$$\mathbf{J}_5 = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

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Sources: https://github.com/kolosovpetro/github-latex-template

- $\mathbf{K}_{N,M}$ – matrix of dimension $N \times M$ defined by

$$\mathbf{K}_{N,M} = (k^r (N-k)^r)_{0 \leq k \leq N,\, 0 \leq r \leq M}$$

For example,

- $\mathbf{T}_M$ – column vector of dimension $M \times 1$ defined by

$$\mathbf{T}_M = (\mathbf{A}_{M,r})_{M=\text{const},\, 0 \leq r \leq M}$$

where $\mathbf{A}_{M,r}$ is a rational coefficient (literature). For example,

1. Main theorem

2. Conclusions

Conclusions of your manuscript.

References

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