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# GENERALIZATION OF THE HUA LO-KEN FORMULA IN THE MATRIX POLYHEDRON

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| ABSTRACT | KEYWORDS |
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| Integral formulas generalizing the Cauchy integral formula in the theory of functions of one complex variable serve as an important constructive tool. Local residues of many complex variables and integral formulas in multivariate complex analysis serve as a basis in the problems of connecting the values of a function within a domain with the boundary of the domain or with a part of the boundary. Therefore, the study of integral formulas and residues of many variables in function theory plays an important role and is considered one of the topical trends in modern mathematics. | Mathematics, HUA LO-KEN, polyhedron, theorem, formula. |

## Introduction

Consider the space of $\hat{\mathbb{C}}[n \times n]$ —skew-symmetric matrices whose elements are complex numbers, and the classical domain of the third type

$$D_3 = \{Z \in \hat{\mathbb{C}}[n \times n] : I^{(n)} + Z\bar{Z} > 0\},$$

where $I^{(n)}$ is the identity matrix of order $n$, $\bar{Z}$ -matrix, the complex conjugate matrix Z (Recall that the condition

$H > 0$ for the Hermitian matrix H means that H is positively defined, i.e. all eigenvalues are positive) ([1],[2]).

The boundary of the $D_3$ domain is defined as follows ([2]):

$$\partial D_3 = \{Z \in \hat{\mathbb{C}}[n \times n] : \det(I^{(n)} + Z\bar{Z}) = 0, I^{(n)} + Z\bar{Z} \geq 0\}.$$

srt in the $D_3$ region is defined as follows [1]:

$$\Gamma = \{Z \in \hat{\mathbb{C}}[n \times n] : I^{(n)} + Z\bar{Z} = 0\}.$$

It is known [4,p.96] that with the help of the Hua Lo-ken integral formula any holomorphic function in the form of an integral (for even n $h(Z) \in O(D_3) \cap C(\bar{D}_3)$ you can imagine in

$$h(Z) = c_n \int \frac{h(X)\,dX}{\ldots^{n-1}}, \tag{1}$$

$$dX = \bigwedge_{i=1,\, j=1\, i\leq j}$$

where

the order of the differentials and the constant

$c_n$

are chosen so that

$$c_n \int \quad \frac{dX}{n-1} \quad \underline{=1.}$$

Let be given a mapping

$$f = \left( \cdot f_1, f_{\frac{n(n-1)}{2}} \right) : G \to \mathbb{C}^{\frac{n(n-1)}{2}}$$

of

some domain.

We introduce the concept of a matrix polyhedron. A matrix polyhedral set defined by a holomorphic image

$$f : G \to \hat{} \left[ n \times n \right],$$

is called a set

f □1 D 3,$r$□ □{$Z$ □$G$ □ $r^2 I$ □$n$□ □$f$ □$Z$ □ $f$ □$Z$ □ □ 0,$r$ □ 0},

The lemma is proved.Now we give an integral interpretation of the local deduction, which follows from the general integral representation for the local deduction obtained in [3] and will be applied to prove the theorem.

Let the map f (Z ) be holomorphic in a closed neighborhood $U_A$ and have at point

$A \in \hat{} \left[ n \times n \right]$

isolated zero. For the sprout

$h : U_A \to$

according to the formula f (Z ), the effect of the local deduction at point A is determined by

$$\operatorname{res}_{A\, f}\left(h\left(Z\right)\right) = c_n \int \frac{h\left(Z\right) \bigwedge_{i=1, j=1,\ i \le j} dz_{ij}}{n-1}, \qquad (4)$$

where $\varepsilon > 0$ – is a small enough number.

**CONCLUSION**

In this paper, a matrix analogue of the Weyl formula in a polyhedron is found,defined using a classical domain of the third type (i.e. $\Omega_{f,r}$)

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