***Research Article***

***Abstract:*** The main aim of the present paper is to evaluate a summation formula of half argument associated with contiguous relation and recurrence relation of gamma function.

***Key words****:* Gaussian Hypergeometric function, Recurrence relation, Bailey summation theorem, Contiguous relation.

**2010 MSC NO**: 33C05 , 33C20 , 33C45, 33D50 , 33D60.

**Introduction:**

**Generalized Gaussian Hypergeometric function of one variable is defined by**

AFB(,a2,…,aA;b1,b2,…bB;z ) = …(1)

where the parameters b1 , b2 , ….,bB are neither zero nor negative integers and A , B are non negative integers.

**Contiguous Relation is defined by**

[Andrews p.363(9.16)]

(a-b) 2F1(a, b ; c; z) = a 2F1(a+1,b; c; z) - b 2F1(a,b+1; c; z) …(2)

**Recurrence relation is defined by**

Γ(ξ+1) **=** ξ Γ(ξ) …(3)

**Bailey summation theorem[Prud, p.491(7.3.7.3)**

2F1(a, 1-a ; ; ) = = …(4)

**Main Summation Formula:**

2F1(a, -a-40 ;; ) =[

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+ +

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+ ] (5)

**Derivations of main result:**

Putting b= -a-40 , z= in known result (2) , we get

(2a+40) 2F1(a, -a-40 ; c; ) = a 2F1(a+1,-a-40; c; ) + (a+40) 2F1(a,-a-39; c; )

Now involving the same parallel method of Ref [5], the main result is derived.