Kyungpook Math. J.
Volume 17, Number 2
December, 1977

SOME TRANSFORMATIONS AND IDENTITIES INVOLVING H-FUNCTION OF TWO VARIABLES

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1, Introduction

Generalizaton to two variables of Fox's H-function [3, p. 408], has been introduced by Verma [6], which will be represented as follows:

$$(1.1)\quad H^{(m_1,m_2):(n_1,n_2),n_3}_{(p_1,p_2),p_3;(q_1,q_2),q_3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}[(a_{p_1},\ A_{p_1})]:[(c_{p_2},\ C_{p_2})]:[e_{p_3},E_{p_3})]\\ [(b_{q_1},\ B_{q_1})]:[(d_{q_2},\ D_{q_2})]:[(f_{q_3},\ F_{q_3})]\end{matrix}\right]$$
$$=\frac{1}{(2\pi i)^2}\int_{L_1}\int_{L_2}\Psi(s,t)\phi(s+t)x^sy^sdsdt,$$

where

$$(1.2)\quad \Psi(s,t)$$
$$=\frac{\prod_{j=1}^{m_1}\Gamma(b_j-B_js)\prod_{j=1}^{n_1}\Gamma(1-a_j+A_js)\prod_{j=1}^{m_2}\Gamma(d_j-D_jt)\prod_{j=1}^{n_2}\Gamma(1-c_j+C_jt)}{\prod_{j=m_1+1}^{q_1}\Gamma(1-b_j+B_js)\prod_{j=n_1+1}^{p_1}\Gamma(a_j-A_js)\prod_{j=m_2+1}^{q_2}\Gamma(1-d_j+D_jt)\prod_{j=n_2+1}^{p_2}\Gamma(c_j-C_jt)}$$

$$(1.3)\quad \phi(s,t)=\frac{\prod_{j=1}^{n_3}\Gamma(1-e_j+E_js+E_jt)}{\prod_{j=n_3+1}^{p_3}\Gamma(e_j-E_js-E_jt)\prod_{j=m_3+1}^{q_3}\Gamma(1-f_j+F_js+F_jt)}$$

and $[(a_p,\ A_p)]$ represents the set of parameters $(a_1,\ A_1)$, $(a_2,\ A_2)$, $\cdots$, $(a_p,\ A_p)$.

In what follows for the sake of brevity $[P_1]$, $[P_2]$, $[P_3]$, $[Q_1]$, $[Q_2]$, $[Q_3]$ denote respectively the sets of parameters $[(a_{p_1},\ A_{p_1})]$, $[(c_{p_2},\ C_{p_2})]$, $[(e_{p_3},\ E_{p_3})]$, $[b_{q_1},\ B_{q_1})]$, $[(d_{q_2},\ D_{q_2})]$, $[(f_{q_3},\ F_{q_3})]$. The contour integral defined in (1.1) will be denoted in a contracted form by $H[x,y]$. Further we mention only those sets of parameters where there is some change, for example,

$$(1.4)\quad H^{(m_1,m_2):(n_1,n_2),n_3+2,}_{(p_1,p_2),p_3+2;(q_1,q_2),q_3+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}[P_1]:[P_2]:(a-r,l),\ (b-r,m),\ [P_3]\\ [Q_1]:[Q_2]:[Q_3],\ (d-r,\ k)\end{matrix}\right]$$

will be written as

$$H^{n_3+2}_{p_3+2,q_3+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-r,\ l),\ (b-r,\ m),\ [P_3]\\ [Q_3],\ (d-r,\ k)\end{matrix}\right].$$

The integral in (1.1) converges, absolutely, if $|\arg x|<\frac{1}{2}\mu_1\pi$ and $|\arg y|<\frac{1}{2}\mu_2\pi$, where

$$(1.5)\quad \mu_1=\left[(\sum_1^{n_1}A_j+\sum_1^{m_1}B_j+\sum_1^{n_3}E_j)-(\sum_{n_1+1}^{p_1}A_j+\sum_{m_1+1}^{q_1}B_j+\sum_{n_3+1}^{p_3}E_j+\sum_1^{q_3}F_j)\right]$$

$$(1.6)\quad \mu_2=\left[(\sum_1^{n_2}C_j+\sum_1^{m_2}D_j+\sum_1^{n_3}E_j)-(\sum_{n_2+1}^{p_2}C_j+\sum_{m_2+1}^{q_2}D_j+\sum_{n_3+1}^{p_3}E_j+\sum_1^{q_3}E_j)\right].$$

Following known results will be utilized in this paper from Luke [4, p.110], we have

$$(1.7)\quad {}_3F_2\left[\begin{matrix}1,\ b,\ c+1;\ z\\ d,\ c\end{matrix}\right]={}_2F_1\left[\begin{matrix}a,\ b;\ z\\ d\end{matrix}\right]+\frac{abz}{cd}\ {}_2F_1\left[\begin{matrix}a+1,\ b+1;\ z\\ d+1\end{matrix}\right].$$

From Rainville [5, p.32], we have,

$$(1.8)\qquad \frac{\Gamma(1-\alpha-n)}{\Gamma(1-\alpha)}=\frac{(-1)^n}{(\alpha)_n}.$$

2. The transformations involving generalized H-function of two variables to be established are:

$$(2.1)\quad \sum_{r=0}^{\infty}\frac{z^r}{r!}H^{n_3+4}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-r,l),\ (b-r,m),\ (c-r-1,n),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r,k),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=\sum_{r=0}^{\infty}\frac{z^r}{r!}H^{n_3+2}_{p_3+2,q_3+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-r,l),\ (b-r,m),\ [P_3]\\ [Q_3],\ (d-r,k)\end{matrix}\right]$$

$$+\sum_{r=0}^{\infty}\frac{z^{r+1}}{r!}H^{n_3+3}_{p_3+3,q_3+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-r-1,l),\ (b-r-1,m),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r-1,k),\ (c-1,n)\end{matrix}\right]$$

where $(\mu_1+l+m-k)>0$, $|\arg x|<\frac{1}{2}(\mu_1+l+m-k)\pi$, $(\mu_2+l+m-k)>0$, $|\arg y|<\frac{1}{2}(\mu_2+l+m-k)\pi$ and $|z|<1$.

$$(2.2)\quad \sum_{r=0}^{\infty}\frac{z^r}{r!}H^{n_3+2}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(c-r-1,n),\ (c,n),\ [P_3],\ (a-r,l),\ (b-r,m)\\ [Q_3],\ (d-r,k),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=\sum_{r=0}^{\infty}\frac{z^r}{r!}H^{n_3}_{p_3+2,q_3+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}[p_3],\ (a-r,l),\ (b-r,m)\\ [Q_3],\ (d-r,k)\end{matrix}\right]$$

$$+\sum_{r=0}^{\infty}\frac{z^{r+1}}{r!}H^{n_3+1}_{p_3+3,q_3+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(c,n),\ [P_3],\ (a-r-1,l),\ (b-r-1,m)\\ [Q_3],(d-r-1,k),\ (c-1,n)\end{matrix}\right]$$

where $(\mu_1-l-m-k)>0$, $|\arg x|<\frac{1}{2}(\mu_1-l-m-k)\pi$,

$(\mu_2-l-m-k)>0$, $|\arg y|<\frac{1}{2}(\mu_2-l-m-k)\pi$ and $|z|<1$.

$$(2.3)\quad \sum_{r=0}^{\infty}\frac{\Gamma(a+r)z^r}{r!}H^{n_3+3}_{p_3+3,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-r,m),\ (c-r-1,n),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r,k),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$
$$=\sum_{r=0}^{\infty}\frac{\Gamma(a+r)z^r}{r!}H^{n_3+1}_{p_3+1,q_3+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-r,m),\ [P_3]\\ [Q_3],\ (d-r,k)\end{matrix}\right]$$
$$+\sum_{r=0}^{\infty}\frac{\Gamma(a+r+1)z^{r+1}}{r!}H^{n_3+2}_{p_3+2,q_3+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-r-1,m),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r-1,k),(c-1,n)\end{matrix}\right]$$

where $(\mu_1+m-k)>0$, $(\mu_2+m-k)>0$, $|\arg x|<\frac{1}{2}(\mu_1+m-k)\pi$, $|\arg y|<\frac{1}{2}(\mu_2+m-k)\pi$ and $|z|<1$.

$$(2.4)\quad \sum_{r=0}^{\infty}\frac{z^r}{r!}H^{(n_1+1,n_2+1),n_3+2}_{(p_1+1,p_2+1),p_3+2;q_3+3}\left[\begin{matrix}x\\ \\y\end{matrix}\middle|\begin{matrix}(a-r,m),\ [P_1]\ ;(b-r,m),\ [P_2]\ ;\\ (c-r-1,m),\ (c,m),\ [P_3]\\ [Q_3],\ (d-r,m),\ (c-r,m),\ (c-1,m)\end{matrix}\right]$$
$$=\sum_{r=0}^{\infty}\frac{z^r}{r!}H^{(n_1+1,n_2+1)}_{(p_1+1,p_2+1);q_3+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-r,m),\ [P_1]\ ;(b-r,m),[P_2]\\ [Q_3],\ (d-r,m)\end{matrix}\right]$$
$$+\sum_{r=0}^{\infty}\frac{z^{r+1}}{r!}H^{(n_1+1,n_2+1),n_3+1}_{(p_1+1,p_2+1),p_3+1;q_3+2}\left[\begin{matrix}x\\ \\y\end{matrix}\middle|\begin{matrix}(a-r-1,m),\ [P_1]\ :\\ (b-r-1,m),\ [P_2]\ ;(c,m),\ [P_3]\\ [Q_3],\ (d-r-1,m),\ (c-1,m)\end{matrix}\right]$$

where $\mu_1>0$, $|\arg x|<\frac{1}{2}\mu_1\pi$, $\mu_2>0$, $|\arg y|<\frac{1}{2}\mu_2\pi$ and $|z|<1$.

PROOF. To establish (2.1), expressing the H-function of two variables on the left-hand side as contour integral (1.1), we get,

$$(2.5)\quad \sum_{r=0}^{\infty}\frac{z^r}{r!}\frac{1}{(2\pi i)^2}\int_{L_1}\int_{L_2}\Psi(s,t)\phi(s+t)\frac{\Gamma(1-a+r+ls+lt)\Gamma(1-b+r+ms+mt)}{\Gamma(1-c+r+ns+nt)\Gamma(2-c+ns+nt)}$$
$$\times\frac{\Gamma(2-c+r+ns+nt)\Gamma(1-c+ns+nt)}{\Gamma(1-d+r+ks+kt)}x^sy^t\,ds\,dt.$$

Now changing the order of summation and integration in view of [1, p. 176 (75)], which is permissible under the conditions given in (2.1), we get,

$$(2.6)\quad \frac{1}{(2\pi i)^2}\int_{L_1}\int_{L_2}\Psi(s,t)\phi(s+t)\frac{\Gamma(1-a+ls+lt)\Gamma(1-b+ms+mt)}{\Gamma(1-d+ks+kt)}$$
$$\times{}_3F_2\left[\begin{matrix}1-a+ls+lt,\ 1-b+ms+mt,\ 2-c+ns+nt;\ z\\ 1-d+ks+kt,\ 1-c+ns+nt\end{matrix}\right]x^sy^t\,ds\,dt.$$

Now applying (1.7), expressing both the Gauss hypergeometric functions as series, changing the order of integration and summation and interpreting the result thus obtained in view of (1. 1), we get the right-hand side.

Proceeding on similar lines the results (2. 2), (2. 3) and (2. 4) can also be established.

3. Particular cases

In this section, we derive some infinite summations from the transformation formulae discussed above. (i) In (2. 1) and (2. 2) putting $z=1$ on both the sides; on the right-hand side expressing H-functions of two variables, as contour integrals, changing the order of summation and integration and evaluating the summations inside the contours with the help of Gauss theorem [2, p. 61, 2. 1. 3 (14)] and using (1. 1), we respectively get the following summations:

$$(3.1)\quad \sum_{r=0}^{\infty}\frac{1}{r!}H^{n_3+4}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-r,l),\ (b-r,m),\ (c-r-1,n),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r,k),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=H^{n_3+3}_{p_3+3,q_3+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a,l),\ (b,m),\ (d-a-b+2,\ k-l-m),\ [P_3]\\ [Q_3](d-a+1,k-l),\ (d-b+1,k-m)\end{matrix}\right]$$

$$+H^{n_3+4}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(a-1,l),\ (b-1,m),\ (d-a-b+3,\ k-l-m),\ (c-n),\ [P_3]\\ [Q_3],\ (d-a+1,k-l),\ (d-b+1,k-m),\ (c-1,n)\end{matrix}\right]$$

where $(\mu_1+l+m-k)>0$, $|\arg x|<\frac{1}{2}(\mu_1+l+m-k)\pi$,

$(\mu_2+l+m-k)>0$ and $|\arg y|<\frac{1}{2}(\mu_2+l+m-k)\pi$.

$$(3.2)\quad \sum_{r=0}^{\infty}\frac{1}{r!}H^{n_3+2}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(c-r-1,n),\ (c,n),\ [P_3],\ (a-r,l),\ (b-r,m)\\ [Q_3],\ (d-r,k),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=H^{n_3+1}_{p_3+3,q_3+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(d-a-b+2,k-l-m),\ [P_3],\ (a,l),\ (b,m)\\ [Q_3],\ (d-a+1,\ k-l),\ (d-b+1,k-m)\end{matrix}\right]$$

$$+H^{n_3+2}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(d-a-b+3,\ k-l-m),\ (c,n),\ [P_3],\ (a-1,l),\ (b-1,m)\\ [Q_3],\ (d-a+1,k-l),\ (d-b+a,k-m),\ (c-1,n)\end{matrix}\right]$$

where $(\mu_1-l-m-k)>0$, $(\mu_2-l-m-k)>0$, $|\arg x|<\frac{1}{2}(\mu_1-l-m-k)\pi$,

and $|\arg y|<\frac{1}{2}(\mu_2-l-m-k)\pi$.

(ii) In (3. 2) putting $l=m=n$ and $k=2n$, we obtain:

$$(3.3)\quad \sum_{r=0}^{\infty}\frac{1}{r!}H^{n_3+2}_{p_3+4,q_3+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(c-r-1,n),\ (c,n),\ [P_3],\ (a-r,n),\ (b-r,n)\\ [Q_3],\ (d-r,2n),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=\Gamma(a+b-d-1)\,H^{n_3}_{p_3+2,q_3+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}[P_3],\ (a,n),\ (b,n)\\ [Q_3],\ (d-a+1,n),\ (d-b+1,\ n)\end{matrix}\right]$$

$$+\Gamma(a+b-d-2)H^{n_s+1}_{p_s+3,q_s+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(c,n),\ [P_3],\ (a-1,n),\ (b-1,n)\\ [Q_3],\ (d-a+1,n),\ (d-b+1,n),\ (c-1,n)\end{matrix}\right],$$

where $(\mu_1-4n)>0$, $(\mu_2-4n)>0$, $|\arg x|<\frac{1}{2}(\mu_1-4n)\pi$ and $|\arg y|<\frac{1}{2}(\mu_2-4n)\pi$.

(iii) In (2.3) setting $z=1$ and applying the similar method as in (3.1), we get,

$$(3.4)\quad \sum_{r=0}^{\infty}\frac{\Gamma(a+r)}{r!}H^{n_s+3}_{p_s+3,q_s+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-r,m),\ (c-r-1,n),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r,k),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=\Gamma a\cdot H^{n_s+2}_{p_s+2,q_s+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b,m),\ (a-b+d+1,k-m),\ [P_3]\\ [Q_3],\ (d+a,k),\ (d-b+1,k-m)\end{matrix}\right]$$

$$+\Gamma(a+1)H^{n_s+3}_{p_s+3,q_s+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-1,m),\ (a-b+d+2,k-m),\ (c,n),\ [P_3]\\ [Q_3],\ (d+a,k),\ (d-b+1,k-m),\ (c-1,n)\end{matrix}\right]$$

valid under conditions as given in (2.3).

(iii) In (3.4) putting $k=m=n$, we get,

$$(3.5)\quad \sum_{r=0}^{\infty}\frac{\Gamma(a+r)}{r!}H^{n_s+3}_{p_s+3,q_s+3}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-r,n),\ (c-r-1,n),\ (c,n),\ [P_3]\\ [Q_3],\ (d-r,n),\ (c-r,n),\ (c-1,n)\end{matrix}\right]$$

$$=\frac{\Gamma a\Gamma(b-a-d)}{\Gamma(b-d)}H^{n_s+1}_{p_s+1,q_s+1}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b,n),\ [P_3]\\ [Q_3],\ (d+a,n)\end{matrix}\right]$$

$$+\frac{\Gamma(a+1)\Gamma(b-a-d-1)}{\Gamma(b-d)}H^{n_s+2}_{p_s+2,q_s+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(b-1,n),\ (c,n),\ [P_3]\\ [Q_3],\ (d+a,n),\ (c-1,n)\end{matrix}\right]$$

where $\mu_1>0, \mu_2>0$, $|\arg x|<\frac{1}{2}\mu_1\pi$, $|\arg y|<\frac{1}{2}\mu_2\pi$.

4. In this section we obtain some interesting identites.

(i) In (3.1) setting $a=c-d-1$, $b=-1$, $m=0$, $k=n-l$; on the left-hand side expressing the H-function as double contour integral, changing the order of summation and integration and using Dixon's theorem [5, p. 92], we get,

$$(4.1)\quad H^{n_s+5}_{p_s+5,q_s+5}\left[\begin{matrix}x\\ \\ y\end{matrix}\middle|\begin{matrix}(d,n-l),\ \left(d-\frac{c}{2}+3,\ \frac{n}{2}-l\right),\ (c-d-1,l),\ \left(\frac{c}{2}-1,\ \frac{n}{2}\right),\ (c,n),\ [P_3]\\ [Q_3],\ (d,n-l),\ (d+2,n-l),\ \left(d-\frac{c}{2}+1,\ \frac{n}{2}-l\right),\ (c-2,n),\ \left(\frac{c}{2}+1,\ \frac{n}{2}\right)\end{matrix}\right]$$

$$=H^{n_s+2}_{p_s+2,q_s+2}\left[\begin{matrix}x\\y\end{matrix}\middle|\begin{matrix}(2d-c+4,\ n-2l),\ (c-d-1,l),\ [P_3]\\ [Q_3],\ (d+2,n-l),\ (2d-c+2,n-2l)\end{matrix}\right]$$

$$+2\cdot H^{n_1+3}_{p_1+3,q_1+3}\left[\begin{array}{c|l} x & (2d-c+5,\ n-2l),\ (c-d-2,l),\ (c,n),\ [P_3] \\ y & [Q_3],\ (d+2,n-l),\ (2d-c+2,\ n-2l),\ (c-1,n) \end{array}\right]$$

where $(\mu_1-n+2l)>0$, $(\mu_2-n+2l)>0$, $|\arg x|<\frac{1}{2}(\mu_1-n+2l)\pi$, $|\arg y|<\frac{1}{2}(\mu_2-n+2l)\pi$.

(ii) In (3.2) putting $a=2c-1$, $b=2c-d-1$, $k=l=2n$, $m=0$ and proceeding as above, we get,

$$(4.2)\quad \Gamma(2c-d-2)H^{n_1+2}_{p_1+3,q_1+3}\left[\begin{array}{c|l} x & (c-1,n),\ (c,n),\ [P_3],\ (2c-1,2n) \\ y & [Q_3],\ (2c-2,2n),\ (d-c+1,n),\ (d-c+2,n) \end{array}\right]$$

$$=\Gamma(4c-2d-3)H^{n_1}_{p_1+1,q_1+1}\left[\begin{array}{c|l} x & [P_3],\ (2c-1,2n) \\ y & [Q_3],\ (2d-2c+2,2n) \end{array}\right]$$

$$+\frac{\Gamma(4c-2d-4)}{\Gamma(2c-d-2)}H^{n_1+1}_{p_1+2,q_1+2}\left[\begin{array}{c|l} x & (c,n),\ [P_3],\ (2c-2,2n) \\ y & [Q_3],\ (2d-2c+2,2n),\ (c-1,n) \end{array}\right]$$

where $(\mu_1-4n)>0$, $(\mu_2-4n)>0$, $|\arg x|<\frac{1}{2}(\mu_1-4n)\pi$, and $|\arg y|<\frac{1}{2}(\mu_2-4n)\pi$.

(iii) In (3.4) setting $a=d-c+2$, $b=-1$, $m=0$, $k=n$ and proceeding on similar lines as above, we have,

$$(4.3)\quad H^{n_1+3}_{p_1+3,q_1+4}\left[\begin{array}{c|l} x & \left(d-\frac{c}{2}+3,\ \frac{n}{2}\right),\ \left(\frac{c}{2}-1,\ \frac{n}{2}\right),\ (c,n),\ [P_3] \\ y & [Q_3],\ (d+2,n),\ \left(d-\frac{c}{2}+1,\ \frac{n}{2}\right),\ (c-2,n),\ \left(\frac{c}{2}+1,\ \frac{n}{2}\right) \end{array}\right]$$

$$=H^{n_1+1}_{p_1+1,q_1+2}\left[\begin{array}{c|l} x & (2d-c+4,n),\ [P_3] \\ y & [Q_3],\ (d+2,n),\ (2d-c+2,n) \end{array}\right]$$

$$+2(d-c+2)H^{n_1+2}_{p_1+2,q_1+3}\left[\begin{array}{c|l} x & (2d-c+5,n)\ (c,n),\ [P_3] \\ y & [Q_3],\ (d+2,n),\ (2d-c+2,n),\ (c-1,n) \end{array}\right]$$

where $(\mu_1-n)>0$, $(\mu_2-n)>0$, $|\arg x|<\frac{1}{2}(\mu_1-n)\pi$ and $|\arg y|<\frac{1}{2}(\mu_2-n)\pi$.

ACKNOWLEDGEMENT. I wish to express my sincere thanks to Dr. P. Anandani for his kind help and valuable guidance during the preparation of this paper.

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REFERENCES

[1] Carslaw, H.S., *Introduction to the theory of Fourier Series and integrals*, Dover Publications, Inc. New York (1950).

[2] Eredelyi, A. et. al., *Higher transcendental functions*. Vol. I, Mc-Graw Hill (1953).

[3] Fox, C., *The G-and H-functions as symmetrical Fourier Kernels'*, Trans. Amer. Math. Soc. 3, 98(1961), 395—429.

[4] Luke, Y.L., *The special functions and their approximations*. Vol. I, Academic Press, New York (1969).

[5] Rainville, E.D., *Special functions*, The Macmillan Company, New York(1960).

[6] Verma, R.U., *'On a generalization of Fox's H-function'*, An. Sti. Univ. "Al. I. Cuza." Iasi Sect. Ia. Mat. (N.S.), 17(1971), 103—110.