Mathematical Theory and Modeling www.iiste.org
ISSN 2224-5804 (Paper) ISSN 2225-0522 (Online)
Vol.3, No.6, 2013-Selected from International Conference on Recent Trends in Applied Sciences with Engineering Applications

Boundary Value Problem and its application in I-Function of Multivariable

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Abstract
In this research paper, we make a model of a boundary value problem and its application in I-function of multivariable. Some particular cases have also been derived at the end of the paper.
Keywords: Boundary value problem, I-Function of multivariable, General class of polynomials.
Mathematics subject classification: 2011, 33c, secondary 33c50.

1. Introduction: Y.N. Prasad [5] is defined. I-Function of multivariable are as follows:

$$\sum\left[Z_1......,Z_r\right]=\sum\nolimits^{o,n_2:o,n_3:.....:o,n_r:(m',n');..........;(m^{(r)},n^{(r)})}_{p_2,q_2:p_3,q_3:....:p_r,q_r:(p',q');......;(p^{(r)},q^{(r)})}$$

$$\left[Z_1,Z_2,.......Z_r\left|\begin{matrix}(a_{2j},\alpha'_{2j};\alpha''_{2j})1,p_2......(a_{rj};\alpha'_{rj};.....\alpha^{(r)}_{rj})1,p_r(a'_j;\alpha'_j)1,p......(a^{(r)}_j;\alpha^{(r)}_j)1,p^{(r)}\\(b_{2j},\beta'_{2j};\beta''_{2j})1,q_2......(b_{rj};\beta'_{rj};.....\beta^{(r)}_{rj})1,q_r(b'_j;\beta'_j)1,q......(b^{(r)}_j;\beta^{(r)}_j)1,q^{(r)}\end{matrix}\right.\right]$$

$$=\frac{1}{(2\pi\omega)^r}\int_{L1}.......\int_{Lr}\phi_1(s_1).......\phi_r(s_r)\psi(s_1....s_r)Z_1^{s_1}.....Z_r^{s}\,ds_1.....ds_r \qquad (1.1)$$

Where

$$\phi_i s_i=\frac{\prod_{j=1}^{m^{(i)}}\overline{|(b_j^{(i)}-\beta_j^{(i)}s_i)}\prod_{j=1}^{n^{(i)}}\overline{|1-(a_j^{(i)}+\alpha_j^{(i)}s_i)}}{\prod_{j=m^{(i)}+1}^{q^{(i)}}\overline{|(1-b_j^{(i)}-\beta_j^{(i)}s_i)}\prod_{j=n^{(i)}+1}^{p^{(i)}}\overline{|(a_j^{(i)}-\alpha_j^{(i)}s_i)}}\ \forall\, i.e.\{1,2,......r\}$$

and $$\psi(s_1,s_2,....s_r)=\frac{\prod_{j=1}^{n_2}\overline{|(1-a_{2j}+\sum_{i=1}^{2}\ )(\alpha_{2j}^{(i)}s_i)}}{\prod_{j=n_2+1}^{p_2}\overline{|(a_{2j}-\sum_{i=1}^{2}\ )(\alpha_{2j}^{(i)}s_i)}}\times$$

$$\frac{1}{\prod_{j=1}^{q_2}\overline{|(1-b_{2j}+\sum_{i=1}^{2}\ )(\beta_{2j}^{(i)}s_i)}.............\prod_{j=1}^{q_r}\overline{|(1-b_{rj}+\sum_{i=1}^{r}\ )(\beta_{rj}^{(i)}s_i)}}$$

The operational techniques are important tools to compute various problem in various fileds of sciences. Which are used in works of Kumar [3] to find out several results in various problem in different field o sciences and thus motivating by this work, we construct a model problem for temperature distribution in a rectangular plate under prescribed boundary conditions and then evaluate it solution involving I-Function of multivariable with products of general class of polynomials

$$S^{m_1,....,m_r}_{n_1,.....,n_r}(x_1,.....,x_r)=\sum_{k_1=0}^{[n_1/m_1]}.....\sum_{k_r=0}^{[n_r/m_r]}\frac{(-n_1)m_1k_1}{k_1!}.....\frac{(-n_r)m_rk_r}{k_r!}F\left[n_1,k_1,......n_rk_r\right]x_1^{k_1}.......x_r^{k_r}. \qquad (1.2)$$

where, $m_1.......,m_r$ are arbitary positive integers and the coefficients $F\left[n_1,k_1,......n_r k_r\right]$ are arbitary constants real or complex. Finally, we derive some new particular cases & find their applications also.

2.A Boundary value problem the boundary value conditions are,

$$\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=a,\ 0<x<\frac{a}{2},\ 0<y<\frac{b}{2} \qquad (2.1)$$

$$\left.\frac{\partial u}{\partial x}\right|_{x=0} = \left.\frac{\partial u}{\partial x}\right|_{x=\frac{a}{2}}=0,\ 0<y<\frac{b}{2} \qquad (2.2)$$

$$U(x,0)=0,\ 0<x<\frac{a}{2} \qquad (2.3)$$

$$U(x,\frac{b}{2})=f(x)=\left(\cos\frac{\pi x}{a}\right)S_{n_1,........n_r}^{m_1........m_r}\left[y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1},.....y_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right]\sum\nolimits_{A,c:[B^{'},D^{'}];..........[B^{(n)},D^{(n)}]}^{0,\lambda[U^{'},V^{'}];..........[U^{(n)},V^{(n)}]}$$
$$\left[\begin{matrix}[(a):\theta^{'},......,\theta^{(n)}]:[(b^{'});\phi^{'}];.......;[(b^{(n)});\phi^{(n)}];\ Z_1\left(\cos\frac{\pi x}{a}\right)^{26_1},.......Z_n\left(\cos\frac{\pi x}{a}\right)26_r \\ [(c):\psi^{'},.......\psi^{(n)}]:[(d^{'});s^{1}];........,[(d^{(n)});\delta^{(n)}];\end{matrix}\right]$$

where, $0<x<\frac{a}{2}$ Provided that $\text{Re}(\eta)-1$, all $\sigma_i(i=1,2,.....,n)$ are positive real numbers, $S_{n_1,....,n_r}^{m_1,...,m_r}[x]$ is due to (1.1) and I-Function of multivariable. u $U(x,y)$ is the temperature distribution in the rectangular plate at point.

3.Main Integral: In our investigations, we make an appeal to the modified formula

$$\int_0^{a/2}\left(\cos\frac{\pi x}{a}\right)^{\eta}\cos\frac{2m\pi x}{a}dx=\frac{a\overline{|(\eta+1)}}{2^{\eta+1}\overline{\left|\left(\frac{\eta}{2}+m+1\right)\right.}\overline{\left|\left(\frac{\eta}{2}-m+1\right)\right.}} \qquad (3.1)$$

$$\int_0^{a/2}\left(\cos\frac{\pi x}{a}\right)^{\eta}\cos\frac{2m\pi x}{a}S_{n_1,.......,n_r}^{m_1,......,m_r}\left[y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1},......,y_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right]\sum\nolimits_{A,c\,:[B^{'},D^{'}];......;[B^{(n)},D^{(n)}]}^{0,\lambda\,:[u^{'},v^{'}];......;[U^{(n)},V^{(n)}]}$$
$$\left[\begin{matrix}[(a):\theta^{'},....,\theta^{(n)}]:[(b^{'});\phi^{'}];.......;[(b^{(n)}),\phi^{(n)}]; \\ [(c):\psi^{'},....,\psi^{(n)}]:[(d^{'});\delta^{'}];......;[(d^{(n)}),\delta^{(n)}];\end{matrix}\right]Z_1\left(\cos\frac{\pi x}{a}\right)^{26_1},......,Z_n\left(\cos\frac{\pi x}{a}\right)^{26_n}dx$$
$$\frac{a}{2^{n+1}}\sum_{k_1=0}^{[n_1/m_1]}.........\sum_{k_r=0}^{[n_r/m_r]}\frac{(-n_1)m_1k_1}{k_1!}........\frac{(-n_r)m_rk_r}{k_r!}F[n_1,k_1,.......n_r,k_r]\times$$
$$\sum(k_1,....,k_r)\left(\frac{y_1}{4p_1}\right)^{k_1}........\left(\frac{y_r}{4p_r}\right)^{k_r} \qquad (3.2)$$

where

$$\sum(k_1,....,k_r)=\sum\nolimits_{A+1,c+2:[B^{'},D^{'}];........,[D^{(n)}D^{(n)}]}^{0,\lambda+1:[U^{'},V^{'}];......;[U^{(n)},V^{(n)}]}$$
$$\left[\begin{matrix}[(a):\theta^{'},.....,\theta^{(n)}],[-\eta-2p_1k_1......-2p_rk_r:2\sigma_1,...2\sigma_n],[\_\_\_\_\_\_\_]; \\ [(c):\psi^{'},.....\psi^{(n)}],[-\eta/2-m-s_1k_1.....-s_rk_r:\sigma_1,.....,\sigma_n],[-\eta/2+m-s_1k_1......-s_rk_r\sigma_1,....\sigma_n]\end{matrix}\right.$$
$$\left.\frac{\left[b^{'}];\phi^{'}\right];.....;\left[(b^{(n)}):\phi^{(n)}\right]_{q_0};}{\left[(d^{'});\delta^{'}\right];....;\left[(d^{(n)}):\delta^{(n)}\right];}\frac{Z_1}{4^{\sigma_1}},.......\frac{Z_n}{4^{\sigma_n}}\right] \qquad (3.3)$$

Provided that $F(n_1,k_1,......n_r,k_r)$ are arbitary functions of $n_1k_1,.......n_rk_r$, real or complex independent of $x,y_j,p_j,j=1,2,....r,$ the condition of (2.4) and (3.1) are satisfied and,

$R_e\left(\eta+\sum_{i=1}^{n}\sigma_i d_i^{(i)}/S_j^{(j)}\right)>-1,\lambda,A,C,U^{(i)},V^{(i)},B^{(i)},D^{(i)}$ are such that,

$A\geq\lambda\geq 0,C\geq 0,D^{(i)}\geq U^{(i)}\geq 0,B^{(i)}\geq V^{(i)}\geq 0$ and

$\theta_j^{(i)},j=1,2,....,A;\ \phi_j^{(i)},j=1,2,.....B^{(i)},\psi_j^{(i)},j=1,2,....C,S_j^{(i)},j=1,2,.....,D^{(i)}$ are positive real numbers, $\arg(z_i)\leq\Delta_i y_2$ and $\Delta_i=-\sum_{j=\lambda+1}^{A}\phi_j^{(i)}+\sum_{j=1}^{V^{(i)}}\phi_k^{(i)}-\sum_{j=V^{(i)}+1}^{B^{(i)}}\phi_j^{(i)}-\sum_{j=1}^{C}\psi_j^{(i)}+\sum_{j=1}^{U^{(i)}}S_j^{(i)}-\sum_{j=U^{(i)}+1}^{D^{(i)}}S_j^{(i)}>0$

$i=1,2,......,n$

4. Solution of Boundary Value Problem:

In this section, we obtain the solution of the boundary value problem stated in the section (2) as using (2.1), (2.2) and (2.3) with the help of the techniques referred to Zill [1] as,

$$U(x,y)-A_0y+\sum_{p=1}A_p\sinh\frac{2p\pi y}{a}\cos\frac{2p\pi x}{a},0<x<\frac{a}{2},0<y<\frac{b}{2}\tag{4.1}$$

for $y=\frac{b}{2}$, we find that

$$U\left(x,\frac{b}{2}\right)=f(x)=\frac{A_0b}{2}+\sum_{p=1}^{\infty}A_p\sinh\frac{p\pi b}{a}\cos\frac{2p\pi x}{a},0<x<\frac{a}{2}\tag{4.2}$$

Now making an appeal to (2.4) & (4.2) and then integrating both sides with respect to x *from* 0 *to* $a/2$, We derive,

$$A_0=\frac{2}{b\sqrt{\pi}}\sum_{k_1=0}^{(n_1/m_1)}.......\sum_{k_r=0}^{(n_r/m_r)}(-n_1)_{m_1k_1}(-n_r)m_rk_r\,F(n_1,k_1,.....n_rk_r)\sum(k_1,....k_r)\frac{y_1^{k_1}}{k_1!}.........\frac{y_r^{k_r}}{k_r!}\tag{4.3}$$

where

$$\sum(k_1,.....k_r)=\sum{}^{0,\lambda+1:[U',V'];......;[U^{(n)},V^{(n)}]}_{A+1,C+1:[B',D'];....;[B^{(n)},D^{(n)}]}$$

$$\left[\begin{matrix}[(a):\theta'....,\theta^{(n)}],[1/2-n/2-s_1k_1......-s_rk_r:\sigma_1,....,\sigma_n]\,[(b'):\phi'],......,[(b^{(n)}):\phi^{(n)}],\\ [(c):\psi^1,...,\psi^{(n)},[-\eta/2-s_1k_1.......-s_rk_r:\sigma_1,....,\sigma_n]\quad[(d'):\delta'],......,[(d^{(n)});\delta^{(n)}]\end{matrix}\right]z_1,....,z_n\tag{4.4}$$

Where all conditions of (2.4), (3.1) and (3.3) are satisfied. Again making an appeal to (2.4) and (4.2) and then multiplying by $\cos 2m\pi x/a$ both sides and integrate w.r.t x from 0 to a/2, we find,

$$A_m=\frac{1}{2^{\eta-1}\sinh\dfrac{p\pi b}{a}}\sum_{k_1=0}^{[n_1/m_1]}........\sum_{k_r=0}^{[n_r/m_r]}\frac{(-n_1)m_1k_1}{k_1!}.......\frac{(-n_r)m_rk_r}{k_r!}F[n_1k_1,....,n_rk_r]$$

$$\sum(k_1,.....,k_r)\left(\frac{y_1}{4p_1}\right)^{k_1}.......\left(\frac{y_r}{4s_r}\right)^{k_r}\tag{4.5}$$

Provided that all condition of (2.4), (3.1), and (3.3) are satisfied. finally making an appeal to the result (4.1), (4.3), and (4.5), we drive the required solution of the boundary value problem,

$$U(x,y)=\frac{2y}{b\sqrt{\pi}}\sum_{k_1=0}^{(n_1/m_1)}.......\sum_{k_r=0}^{(n_r/m_r)}\left[\prod_{s=1}^{r}\left((-n_j)m_jk_j\frac{y_j^{k_j}}{k_j}\right)\right]\tag{4.6}$$

$$F[n_1,k_1,....,n_rk_r].\sum(k_1,....k_r)+\sum_{m=1}^{r}\left((-n_j)m_jk_m\left(\frac{y_j}{4s_j}\right)^{k_j}\frac{1}{k_j!}\right)F[n_1,k_1,...,n_rk_r]\sum(k_1,...k_r)$$

Where, $0<x<a/2<0<y<b/2$, provided that all conditions f (2.4), (3.1) and (3.3) are satisfied.

5. Expansion Formula:

With the aid of (2.4) and (4.6) and then setting $y=(b/2)$ we evaluate the expansion formula,

$$\left(\cos\frac{\pi x}{a}\right)^n S_{n_1,...,n_r}^{m_1,...,m_r}\left[y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1},......,y_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right]$$

$$\sum{}_{A,C:[B'D'];.........;[B^{(n)}D^{(n)}]}^{o,\lambda:[u'v'];.........;[u^{(n)}v^{(n)}]}\left[\begin{matrix}[(a):\theta',.....\theta^{(n)}]:[(b'):\phi];.........;[(b)^{(n)}:\phi^{(n)}]\\ [c:\varphi',....,\varphi^{(n)}]:[(d'):\delta'];......;[(d)^{(n)}]:\delta^{(n)}\end{matrix}\right]Z_1\left(\cos\frac{\pi x}{a}\right)^{2s_1},.....,Z_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}$$

$$=\frac{1}{\sqrt{\pi}}\sum_{k_1=0}^{(n_1/m_1)}...........\sum_{k_r=0}^{(n_r/m_r)}\left[\prod_{j=1}^{r}\left((-n_j)m_jk_j\frac{y_j^{kj}}{k_j}\right)\right]F[n_1,k_1,....,n_r,k_r].$$

$$\sum(k_1,....,k_r)+\sum_{m=1}^{\infty}\frac{\cos 2m\pi x}{2^{n-1}}\sum_{k_1=0}^{((n_1/m_1)}...........\sum_{k_r=0}^{(n_r/m_r)}\left[\prod_{j=1}^{r}\left((-n_j)m_jk_j\left(\frac{y_j}{4p_i}\right)^{k_j}\frac{1}{k_j}\right)\right]$$

$$F[n_1,k_1,........,n_r,k_r].\sum(k_1,.....k_r).$$

Where $0<x<(a/2)$, provided that all conditions of (2.4), (3.1) and (3.3) are satisfied.

6. Particular cases and Applications:

In this section, we do some setting of different parameters of our results and then drive some particular cases as stated here as taking $m_1=m_r=\gamma$ and,

$$F[n_1,k_1,....,n_r,k_r]=\left[\frac{h}{(-v)^\gamma}\right]^{k_1+......+k_r}\frac{1}{(1+p-n_1....n_r)/(k_1+....+k_r)}\text{ in (1.1)}$$

We get,

$$S_{n_1,....n_r}^{\gamma_1,....y_r}[x_1,.....x_r]=\frac{(-V)^{-n_1,........,n_r}}{(-P)_{n_1+.....+n_r}}(x_1)^{n_1/\gamma.......(x_r)^{n_r/\gamma}},\sum{}_{n_1,.........n_r}^{(h,\gamma,v,p)}\left[(x_1)^{-1/\gamma},.....,(x_r)^{-1/\gamma}\right]\quad(6.1)$$

and thus, we obtain an integral for product of a class of polynomials of several variables

$$\int_0^{a/2}\left(\cos\frac{\pi x}{a}\right)^\eta\cos\frac{2\pi x}{a}\frac{(-V)^{n_1,........n_r}}{(-P)_{n_1+......+n_r}}\left[y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1}\right]^{n_1/\gamma}.......$$

$$\left[\gamma_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right]^{n_r/\gamma}\sum{}_{n_1,.....n_r}^{(h,\gamma,v,p)}\left[\left\{y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1}\right\}^{1/\gamma},......,\left\{y_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right\}^{1/\gamma}\right]$$

$$\sum{}_{A,C:[B',D'];.....;[B^{(n)},V^{(n)}]}^{o,\lambda:[u',v'];.....;[u^{(n)},v^{(n)}]}\left[\begin{matrix}[(a):\theta',....,\theta^{(n)}]:(b');(\phi');....;[(b)^{(n)};\phi^{(n)}]\\ [(c):\varphi',....,\varphi^{(n)}]:(d');(\delta');....;[(\delta)^{(n)};\delta^{(n)}]\end{matrix}\right]$$

$$Z_1\left(\cos\frac{\pi x}{a}\right)^{2\sigma_1},......,Z_n\left(\cos\frac{\pi x}{a}\right)^{2\sigma_n}dx$$

$$=\frac{a}{2^{n+1}}\sum_{k_1=0}^{(n_1/\gamma)}.....\sum_{k_r=0}^{(n_r/\gamma)}(-n_1)\gamma k_1........(-n_r)\gamma k\left[\frac{h}{(-V)^\gamma}\right]^{k_1+....+k_r}\frac{1}{k_1!}.....\frac{1}{k_r!}\frac{1}{(1+P-n_1,....n_r)\gamma_{(k_1+...k_r)}}\sum(k_1,....k_r)$$

$$\left(\frac{y_1}{4s_1}\right)^{k_1}.....\left(\frac{y_r}{4s_r}\right)^{k_r} \tag{6.2}$$

Provided that all condition one of (2.4), (3.1) and (3.2) are satisfied.
The solution of the given problem is:

$$U(x,y)=\frac{2y}{b\sqrt{\pi}}\sum_{k_1=0}^{[n_1/\gamma]}........\sum_{k_r=0}^{[n_r/\gamma]}\left[\prod_{\partial=1}^{r}\left\{(-n_j)\gamma k_j\left(\frac{hy_j}{(-v)^{\gamma}}\right)^{k_j}\frac{1}{k_j!}\right\}\right]$$

$$\frac{1}{(1+p-n_1....-n_r)\gamma_{(k_1+....+k_r)}}\sum(k_1,...,k_r)+\sum_{m=1}^{\infty}\frac{\sinh\frac{2m\pi y}{a}\cos\frac{2m\pi x}{a}}{2^{\eta-1}\sinh\frac{m\pi b}{a}}\sum_{k_1=0}^{[n_1/\gamma]}...........$$

$$\sum_{k_r=0}^{[n_r/\gamma]}\left[\prod_{j=1}^{r}(-n_j)\gamma_{kj}\left\{\frac{hy_j}{(-v)\gamma 4s_j}\right\}^{k_j}\frac{1}{k_j!}\right]\frac{1}{(1+p-n_1-......-n_r)/\gamma_{(k_1+.....+k_r)}}.\sum(k_1,....,k_r) \tag{6.3}$$

When $0<x<(a/2), 0<y<(b/2),$ provided that all condition of (2.4), (3.1) and (3.3) are satisfied,
The expansion formula is,

$$\frac{(-V)^{-n_1.....n_r}}{(-P)_{n_1+.....+n_r}}\left(\cos\frac{\pi x}{a}\right)^{\eta}\left[y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1}\right]^{n_1/\gamma}....\left[y_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right]^{n_r/\gamma}$$

$$\sum_{n_1,........n_r}^{(h,y,v,p)}\left[\left\{y_1\left(\cos\frac{\pi x}{a}\right)^{2s_1}\right\}^{-1/\gamma},.....,\left\{y_r\left(\cos\frac{\pi x}{a}\right)^{2s_r}\right\}^{-1/\gamma}\right]$$

$$\sum_{A,c:[B',D'];....;[B^{(n)},D^{(n)}]}^{0,\lambda:[u',v'];....;[u^{(n)},v^{(n)}]}\left[\begin{matrix}[(a):\theta',...,\theta^{(n)}]:[(b');\phi'];.....;[(b^{(n)});\phi^{(n)}]\\ [(c);\varphi',...,\varphi^{(n)}]:[(d');\delta'];.....;[(d^{(n)});\delta^{(n)}]\end{matrix}\right.$$

$$\left.Z_1\left(\cos\frac{\pi x}{a}\right)^{2\sigma_1},....,Z_n\left(\cos\frac{\pi x}{a}\right)^{2\sigma x}\right]$$

$$=\frac{1}{\sqrt{\pi}}\sum_{k_1=0}^{()}.........\sum_{k_r=0}\left(\prod_{j=1}^{0}\left[(-n_j)\gamma k_j\left(\frac{hy_j}{[-v]\gamma 4}\right)k_j\frac{1}{k_j!}\right]\right)$$

$$\frac{1}{(1+p-n_1-.....-n_r)\gamma_{(k_1+....+k_r)}}\sum(k_1,...,k_r)+\sum_{m=1}^{\infty}\frac{\cos\frac{2m\pi x}{a}}{2^{\eta-1}}\sum_{k_1=0}^{[n_1/\gamma]}........\sum_{k_r=0}^{[n_r/\gamma]}\left[\prod_{j=1}^{r}(-n_j)\gamma k_j\left\{\frac{hy_j}{(-v)^{\gamma}4s_j}\right\}^{k_j}\frac{1}{k_j!}\right]$$

$$\frac{1}{(1+p-n_1-.....-n_r)\gamma^{(k_1+....+k_r)}}\sum(k_1,..,k_r) \tag{6.4}$$

When $0<x<a/2,$ provided that all conditions of (2.4), (3.1) and (3.3) are satisfied

$$\sum_{n_1,....,n_r}^{(h,\gamma,1,p)}\left(\frac{x_1}{p},....,\frac{x_r}{p}\right)= \sum_{n_1,...n_r}^{(h,\gamma,1/p,p)}(x_1,...,x_r)=g_{n_1}^{\gamma}(x_1,h)......g_{n_r}^{\gamma}(x_r,h) \tag{6.5}$$

to the results, we evaluate the another results of Hermite polynomials by same techniques.

Reference:

1. Dennis, G. Zill : A first course in differential equations with applications, IIed. Prindle, Weber and Boston, 1982.

2. H.W. Gould and A.T. Hopper : Operational formulas connected with two generalizations of Hermite polynomials. Duke Math. 29 (1962), p-51-64.
3. H. Kumar: Special functions and their applications in modern science and technology, Ph.D. thesis, Barkatullah University, Bhopal, M.P. India, (1992-1993).
4. H.M. Srivastava : Pacific J. Math. 117 (1985), p-183-191
5. Prasad, Y.N.: on multivariable I-function. Vigyan anusandhan patrika, 26, (4), 1986, p-231-235.