Annexure No - 20

ISSN : 2454-5775

FUNDAMENTAL RESEARCH

A MONTHLY MULTIDISCIPLINARY PEER REVIEWED RESEARCH JOURNAL

VOLUME:05, ISSUE: 08 AUGUST : 2015

EDITOR

DR. RANJANA YADAV

78

56

FUNDAMENTAL RESEARCH

A MONTHLY MULTIDISCIPLINARY PEER REVIEWED RESEARCH JOURNAL

© FR, VOLUME- 05, ISSUE-08 AUGUST: 2015, ISSN: 2454-5775

MUTIVARIABLE ANALOGUE OF GENERALIZED TRUESDEL POLYNOMIALS

S. S. CHAUHAN

DEPARTMENT OF MATHEMATICS, D. V. POSTGRADUATE COLLEGE, ORAI.

RECEIVED: 13.04.2015 REVIEWED: 01.08.2015 ACCEPTED: 05.08.2015

ABSTRACT

In the present paper, we introduce and study multivariable analogue of generalized Truesdell polynomials of Singh [*Riv. Math. Univ.* Parma (2) 8 (1967), 345-353] defined by Rodrigues' formula:

$$(1)\quad E_{n_1,\ldots,n_m}^{(a_1,\ldots,a_m;r_1,\ldots,r_m;p_1,\ldots,p_m;b)}(x_1,\ldots,x_m)$$

$$= x_1^{-a_1}\ldots x_m^{-a_m}\left[1+p_1x_1^{r_1}+\ldots+p_mx_m^{r_m}\right]b^{(n_1,\ldots,n_m)}$$

$$\delta_1^{n_1}\ldots\delta_m^{n_m}\left\{x_1^{a_1}\ldots x_m^{a_m}\left(1+p_1x_1^{r_1}+\ldots+p_mx_m^{r_m}\right)^{-b}\right\},$$

where $\delta_i = x_i\frac{\partial}{\partial x_i}(i=1,\ldots,m), n_1,\ldots,n_m$ are positive integers and $a_1,\ldots,a_m;\ r_1,\ldots,r_m;\ p_1,\ldots,p_m;b$ are arbitrary numbers real or complex independent of $x_1,\ldots,x_m$.

The study of these polynomials is of special interest, because these polynomials are neither touched in the multivariable analogue of Gould and Hopper's polynomials $T_n^{a,k}(x,r,p)$ similarly defined and studied by Chandel and Tiwari (*Ganita Sandesh*, 5 (2) (1991), 92-95) nor included in multivariable analogue of the class of polynomials of Chandel (*Indian J. Math.*, 15 (1973), 119-136; *Indian J. Math.*, 16 (1974), 39-48; *Publ. Del Institute Mathematique* 22 (36) (1977), 43-48) defined by Chandel and Agrawal (*Jñānābha*, 23 (1993), 105-113). Our polynomials are exceptional case of these polynomials.

The present multivariable analogue of generalized Truesdell polynomial defined by (1) is also quite different from multivariable generalized Truesdell polynomials recently introduced and studied by Chandel and Chauhan (*Jour. Pure Math.*, 26, 2009, 1-13)

In this present paper, Generalization of Rodrigues' formula (1) is also introduced and studied.

2010 Mathematics Subject Classification. 33C50

Keywords : Mulivariable Analogue, Generalized Truesdell polynomials.

1. Introduction.

Chandel and Tiwari [1] introduced and studied multivariable analogue of Gould and Hopper's polynomials [7] through their Rodrigues' formula :

$$(1.1)\quad H_{n_1,\ldots,n_m}^{(a_1,\ldots,a_m;r_1,\ldots,r_m;b)}(x_1,\ldots,x_m)$$

$$=(-1)^{n_1+\ldots+n_m}x_1^{-a_1}\ldots x_m^{-a_m}\left[1+p_1x_1^{r_1}+\ldots+p_mx_m^{r_m}\right]^b$$

$$\frac{d^{n_1}}{dx_1^{n_1}}\ldots\frac{d^{n_m}}{dx_m^{n_m}}\left\{x_1^{a_1}\ldots x_m^{a_m}\left(1+p_1x_1^{r_1}+\ldots+p_mx_m^{r_m}\right)^{-b}\right\}$$

where parameters $n_1,\ldots,n_m$ are positive integers; $r_1,\ldots,r_m$, $a_1,\ldots,a_m$, $p_1,\ldots,p_m$, b are unsestricted in general but independent of $x_1,\ldots,x_m$.

Further Chandel and Agrawal [4] introduced multivariable analogue of the class of polynomials $T_n^{a,k}(x,r,p)$ of Chandel [1,2,3], defined by

$$(1.2)\quad T_{n_1,\ldots,n_m}^{(a_1,\ldots,a_m;k_1,\ldots,k_m;r_1,\ldots,r_m;p_1,\ldots,p_m;b)}(x_1,\ldots,x_m)$$

$$=x_1^{-a_1}\ldots x_m^{-a_m}\left[1+p_1x_1^{r_1}+\ldots+p_mx_m^{r_m}\right]^b$$

$$\Omega_{x_1}^{n_1}\ldots\Omega_{x_m}^{n_m}\left\{x_1^{a_1}\ldots x_m^{a_m}\left(1+p_1x_1^{r_1}+\ldots+p_mx_m^{r_m}\right)^{-b}\right\}$$

$$\Omega_{x_i}=x^{k_i}\frac{d}{dx^i}$$

where $a_1,\ldots,a_m;\ k_1,\ldots,k_m;\ r_1,\ldots,r_m;\ p_1,\ldots,p_m;\ b$ are arbitrary in general independent of variables $x_1,\ldots,x_m$ and no $k_i=1$, $i=1,\ldots,m$.

For $k_i=0$, ($i=1,\ldots,m$), (1.2) reduces to (1.1) It is also clear that

$$(1.3)\quad \lim_{b\to\infty} T_{n_1,\ldots,n_m}^{(a_1,\ldots,a_m;k_1,\ldots,k_m;r_1,\ldots,r_m;p_1/b,\ldots,p_m/b;b)}(x_1,\ldots,x_m)$$

$$=T_{n_1}^{(a_1,k_1)}(x_1,r_1,p_1)\ldots T_{n_m}^{(a_m,k_m)}(x_m,r_m,p_m),$$

Self Attested