



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH
Volume 11 Issue 5 Version 1.0 August 2011
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
ISSN: 0975-5896

Creation of a Summation Formula Connected To Contiguous Relation and Hypergeometric Function

By Salahuddin

P.D.M College of Engineering, Bahadurgarh , Haryana, India

Abstract - The main aim of present paper is the creation of a summation formula related to Contiguous relation[1] and Hypergeometric function.

Keywords : *Contiguous relation, Recurrence relation, Gauss second summation theorem.*

Classification 2000 MSC NO : *33C05 , 33C20 , 33C45 , 33C60, 33C70*



Strictly as per the compliance and regulations of:



Creation of a Summation Formula Connected To Contiguous Relation and Hypergeometric Function

Salahuddin

Abstract - The main aim of present paper is the creation of a summation formula related to Contiguous relation [1] and Hypergeometric function.

Keywords : Contiguous relation, Recurrence relation, Gauss second summation theorem.

1. INTRODUCTION

Generalized Gaussian Hypergeometric function of one variable :

$${}_A F_B \left[\begin{matrix} a_1, a_2, \dots, a_A ; \\ b_1, b_2, \dots, b_B ; \end{matrix} z \right] = \sum_{k=0}^{\infty} \frac{(a_1)_k (a_2)_k \dots (a_A)_k z^k}{(b_1)_k (b_2)_k \dots (b_B)_k k!} \quad (1)$$

Or

$${}_A F_B \left[\begin{matrix} (a_A) ; \\ (b_B) ; \end{matrix} z \right] \equiv {}_A F_B \left[\begin{matrix} (a_j)_{j=1}^A ; \\ (b_j)_{j=1}^B ; \end{matrix} z \right] = \sum_{k=0}^{\infty} \frac{((a_A))_k z^k}{((b_B))_k k!} \quad (2)$$

Where the parameters $b_1, b_2, \dots, b_B$ are neither zero nor negative integers and A, B are non - negative integers.

Contiguous Relations :

[Andrews p.367(8), E. D. p.52(19), H.T. F. I p.103(38)]

$$c(1-z) {}_2 F_1 \left[\begin{matrix} a, b ; \\ c ; \end{matrix} z \right] = c {}_2 F_1 \left[\begin{matrix} a-1, b ; \\ c ; \end{matrix} z \right] - (c-b) z {}_2 F_1 \left[\begin{matrix} a, b ; \\ c+1 ; \end{matrix} z \right] \quad (3)$$

[Abramowitz p.558(15.2.19)]

$$(a-b)(1-z) {}_2 F_1 \left[\begin{matrix} a, b ; \\ c ; \end{matrix} z \right] = (c-b) {}_2 F_1 \left[\begin{matrix} a, b-1 ; \\ c ; \end{matrix} z \right] + (a-c) {}_2 F_1 \left[\begin{matrix} a-1, b ; \\ c ; \end{matrix} z \right] \quad (4)$$

Recurrence relation :

$$\Gamma(z+1) = z \Gamma(z) \quad (5)$$

Gauss second summation theorem [Prud.,p. 491(7.3.7.5)]

$${}_2 F_1 \left[\begin{matrix} a, b ; \\ \frac{a+b+1}{2} ; \end{matrix} \frac{1}{2} \right] = \frac{\Gamma(\frac{a+b+1}{2}) \Gamma(\frac{1}{2})}{\Gamma(\frac{a+1}{2}) \Gamma(\frac{b+1}{2})} \quad (6)$$

$$= \frac{2^{(b-1)} \Gamma(\frac{b}{2}) \Gamma(\frac{a+b+1}{2})}{\Gamma(b) \Gamma(\frac{a+1}{2})} \quad (7)$$

A new summation formula [Ref.[2], p.337(10)]

$${}_2F_1 \left[\begin{matrix} a, & b & ; & 1 \\ \frac{a+b-1}{2} & ; & 2 \end{matrix} \right] = \frac{2^{(b-1)} \Gamma(\frac{a+b-1}{2})}{\Gamma(b)} \left[\frac{\Gamma(\frac{b}{2})}{\Gamma(\frac{a-1}{2})} \left\{ \frac{(b+a-1)}{(a-1)} \right\} + \frac{2 \Gamma(\frac{b+1}{2})}{\Gamma(\frac{a}{2})} \right] \quad (8)$$

II. MAIN SUMMATION FORMULA

For the main formula $a \neq b$

For $a < 1$ and $a > 29$

$$\begin{aligned} {}_2F_1 \left[\begin{matrix} a, & b & ; & 1 \\ \frac{a+b-29}{2} & ; & 2 \end{matrix} \right] &= \frac{2^{(b-1)} \Gamma(\frac{a+b-29}{2})}{(a-b)\Gamma(b)} \left[\frac{\Gamma(\frac{b}{2})}{\Gamma(\frac{a-29}{2})} \left\{ \frac{(-6190283353629375a)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \right. \right. \\ &+ \frac{(14459713484342175a^2 - 13121113142970855a^3 + 6520139954328519a^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(-2046225352864875a^5 + 437602985498315a^6 - 66696220706115a^7 + 7442156684963a^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(-617014151325a^9 + 38205040445a^{10} - 1759562805a^{11} + 59394517a^{12} - 1426425a^{13})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(23065a^{14} - 225a^{15} + a^{16} + 6190283353629375b - 20224606881433995a^2b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(24414112451554866a^3b - 12588514259366505a^4b + 4384293790660180a^5b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(-882351615046635a^6b + 148574697339502a^7b - 14777453889915a^8b + 1383157455640a^9b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(-71906369145a^{10}b + 3885833198a^{11}b - 100340955a^{12}b + 3024980a^{13}b - 30225a^{14}b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\ &+ \frac{(434a^{15}b - 14459713484342175b^2 + 20224606881433995ab^2 - 11735766636113070a^3b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \end{aligned}$$

$$\begin{aligned}
 & + \frac{(9090326128591095a^4b^2 - 2896776266543295a^5b^2 + 757314109245930a^6b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-98832454416660a^7b^2 + 13445576481135a^8b^2 - 847258652835a^9b^2 + 66766662300a^{10}b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1993919070a^{11}b^2 + 92736345a^{12}b^2 - 1038345a^{13}b^2 + 26970a^{14}b^2 + 13121113142970855b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-24414112451554866ab^3 + 11735766636113070a^2b^3 - 2149637822784855a^4b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(1183582613062230a^5b^3 - 237762013535100a^6b^3 + 48732039707280a^7b^3 - 3991249561815a^8b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(447929438010a^9b^3 - 16234996050a^{10}b^3 + 1085488560a^{11}b^3 - 14199705a^{12}b^3 + 566370a^{13}b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-6520139954328519b^4 + 12588514259366505ab^4 - 9090326128591095a^2b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(2149637822784855a^3b^4 - 154818398535750a^5b^4 + 64459961486850a^6b^4 - 7958826637650a^7b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(1318930698825a^8b^4 - 61618021875a^9b^4 + 5799965925a^{10}b^4 - 92035125a^{11}b^4 + 5259150a^{12}b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(2046225352864875b^5 - 4384293790660180ab^5 + 2896776266543295a^2b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1183582613062230a^3b^5 + 154818398535750a^4b^5 - 4765553285850a^6b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(1564770434220a^7b^5 - 108515480625a^8b^5 + 14881236900a^9b^5 - 302401125a^{10}b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$





$$\begin{aligned}
 & + \frac{(24192090a^{11}b^5 - 437602985498315b^6 + 882351615046635ab^6 - 757314109245930a^2b^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(237762013535100a^3b^6 - 64459961486850a^4b^6 + 4765553285850a^5b^6 - 61354862100a^7b^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(16380836325a^8b^6 - 488494125a^9b^6 + 56448210a^{10}b^6 + 66696220706115b^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-148574697339502ab^7 + 98832454416660a^2b^7 - 48732039707280a^3b^7 + 7958826637650a^4b^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1564770434220a^5b^7 + 61354862100a^6b^7 - 265182525a^8b^7 + 58929450a^9b^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-7442156684963b^8 + 14777453889915ab^8 - 13445576481135a^2b^8 + 3991249561815a^3b^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1318930698825a^4b^8 + 108515480625a^5b^8 - 16380836325a^6b^8 + 265182525a^7b^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(617014151325b^9 - 1383157455640ab^9 + 847258652835a^2b^9 - 447929438010a^3b^9)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(61618021875a^4b^9 - 14881236900a^5b^9 + 488494125a^6b^9 - 58929450a^7b^9 - 38205040445b^{10})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(71906369145ab^{10} - 66766662300a^2b^{10} + 16234996050a^3b^{10} - 5799965925a^4b^{10})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(302401125a^5b^{10} - 56448210a^6b^{10} + 1759562805b^{11} - 3885833198ab^{11} + 1993919070a^2b^{11})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1085488560a^3b^{11} + 92035125a^4b^{11} - 24192090a^5b^{11} - 59394517b^{12} + 100340955ab^{12})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-92736345a^2b^{12} + 14199705a^3b^{12} - 5259150a^4b^{12} + 1426425b^{13} - 3024980ab^{13})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$

$$\begin{aligned}
 & + \frac{(1038345a^2b^{13} - 566370a^3b^{13} - 23065b^{14} + 30225ab^{14} - 26970a^2b^{14} + 225b^{15})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-434ab^{15} - b^{16})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} \left\{ + \frac{\Gamma(\frac{b+1}{2})}{\Gamma(\frac{a-28}{2})} \left\{ \frac{(9929789119274850a - 15491642259222720a^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \right. \right. \\
 & + \frac{(11638964717574354a^3 - 4301343369552768a^4 + 1253747784215818a^5 - 201126858232640a^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(30546110939162a^7 - 2485955985664a^8 + 217757164134a^9 - 9269332800a^{10} + 478875254a^{11})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-9962368a^{12} + 289198a^{13} - 2240a^{14} + 30a^{15} - 9929789119274850b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(15555346969469706a^2b - 12813960443208960a^3b + 6481731067775438a^4b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-1515408978736896a^5b + 337720529526218a^6b - 35628106560000a^7b + 4390411998314a^8b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-229181664768a^9b + 16800248686a^{10}b - 416282880a^{11}b + 18201898a^{12}b - 166656a^{13}b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(4030a^{14}b + 15491642259222720b^2 - 15555346969469706ab^2 + 5635201740688740a^3b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-2741640041773120a^4b^2 + 1013554930920866a^5b^2 - 151523346853376a^6b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(26800290613336a^7b^2 - 1790230626240a^8b^2 + 182599613658a^9b^2 - 5522995712a^{10}b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(342148612a^{11}b^2 - 3739840a^{12}b^2 + 138446a^{13}b^2 - 11638964717574354b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} +
 \end{aligned}$$

$$\begin{aligned}
 & + \frac{(12813960443208960ab^3 - 5635201740688740a^2b^3 + 723609777250674a^4b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-215556136143360a^5b^3 + 61365006725256a^6b^3 - 5693437596672a^7b^3 + 821169360882a^8b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-31480247040a^9b^3 + 2698715292a^{10}b^3 - 35902464a^{11}b^3 + 1893294a^{12}b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(4301343369552768b^4 - 6481731067775438ab^4 + 2741640041773120a^2b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-723609777250674a^3b^4 + 39086251409460a^5b^4 - 7016427169920a^6b^4 + 1595208776220a^7b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-83706249600a^8b^4 + 10049696250a^9b^4 - 168292800a^{10}b^4 + 12271350a^{11}b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-1253747784215818b^5 + 1515408978736896ab^5 - 1013554930920866a^2b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(215556136143360a^3b^5 - 39086251409460a^4b^5 + 943874861580a^6b^5 - 93850421760a^7b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(17505768510a^8b^5 - 396998400a^9b^5 + 40320150a^{10}b^5 + 201126858232640b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-337720529526218ab^6 + 151523346853376a^2b^6 - 61365006725256a^3b^6 + 7016427169920a^4b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-943874861580a^5b^6 + 9848041560a^7b^6 - 416848320a^8b^6 + 65132550a^9b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-30546110939162b^7 + 35628106560000ab^7 - 26800290613336a^2b^7 + 5693437596672a^3b^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} +
 \end{aligned}$$

$$\begin{aligned}
 & + \frac{(-1595208776220a^4b^7 + 93850421760a^5b^7 - 9848041560a^6b^7 + 35357670a^8b^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(2485955985664b^8 - 4390411998314ab^8 + 1790230626240a^2b^8 - 821169360882a^3b^8)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(83706249600a^4b^8 - 17505768510a^5b^8 + 416848320a^6b^8 - 35357670a^7b^8 - 217757164134b^9)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(229181664768ab^9 - 182599613658a^2b^9 + 31480247040a^3b^9 - 10049696250a^4b^9)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(396998400a^5b^9 - 65132550a^6b^9 + 9269332800b^{10} - 16800248686ab^{10} + 5522995712a^2b^{10})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-2698715292a^3b^{10} + 168292800a^4b^{10} - 40320150a^5b^{10} - 478875254b^{11} + 416282880ab^{11})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-342148612a^2b^{11} + 35902464a^3b^{11} - 12271350a^4b^{11} + 9962368b^{12} - 18201898ab^{12})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(3739840a^2b^{12} - 1893294a^3b^{12} - 289198b^{13} + 166656ab^{13} - 138446a^2b^{13} + 2240b^{14})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-4030ab^{14} - 30b^{15})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} \Bigg\} \quad (9)
 \end{aligned}$$

III. DERIVATION OF MAIN SUMMATION FORMULA :

Substituting $c = \frac{a+b-29}{2}$ and $z = \frac{1}{2}$ in equation (4), we get

$$(a-b) {}_2F_1 \left[\begin{matrix} a, b \\ \frac{a+b-29}{2} \end{matrix} ; \frac{1}{2} \right] = (a-b-29) {}_2F_1 \left[\begin{matrix} a, b-1 \\ \frac{a+b-29}{2} \end{matrix} ; \frac{1}{2} \right] + (a-b+29) {}_2F_1 \left[\begin{matrix} a-1, b \\ \frac{a+b-29}{2} \end{matrix} ; \frac{1}{2} \right]$$

Now involving (8), we get

$$L.H.S = \frac{2^{(b-1)} \Gamma(\frac{a+b-29}{2})}{\Gamma(b)} \left[\frac{(a-b-29)(b-1)}{(a-b+1)} \frac{\Gamma(\frac{b}{2})}{\Gamma(\frac{a-29}{2})} \left\{ \frac{6190283353629375}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \right. \right.$$

$$\begin{aligned}
 & + \frac{(-8055972084035925a - 1616392482200145a^2 + 6545235516842331a^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-4248216825020805a^4 + 1462132132021015a^5 - 320488415412165a^6 + 48202739351767a^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-5162979107715a^8 + 400775348545a^9 - 22625638035a^{10} + 919973873a^{11} - 26244855a^{12})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(498365a^{13} - 5655a^{14} + 29a^{15} - 14459713484342175b + 24912724982942250ab)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-10303006262294205a^2b - 2596215568394844a^3b + 3745061321133657a^4b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1500877287187498a^5b + 352103134363795a^6b - 53414874649352a^7b + 5770777441211a^8b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-432319504074a^9b + 23960048385a^{10}b - 894640604a^{11}b + 24237707a^{12}b - 370678a^{13}b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(3625a^{14}b + 13121113142970855b^2 - 25090282486282455ab^2 + 15211233519617970a^2b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-2788293602201802a^3b^2 - 805278615559779a^4b^2 + 592074582718251a^5b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-152005752412020a^6b^2 + 25039023203844a^7b^2 - 2577581061327a^8b^2 + 199541321583a^9b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-9686890590a^{10}b^2 + 369359718a^{11}b^2 - 7237269a^{12}b^2 + 115101a^{13}b^2 - 6520139954328519b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(13108577078985156ab^3 - 9036235922107038a^2b^3 + 2763679802745492a^3b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(-236996129977305a^4b^3 - 81510903588600a^5b^3 + 35627232576540a^6b^3 - 5812690315320a^7b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(681267356055a^8b^3 - 44069719500a^9b^3 + 2398342050a^{10}b^3 - 59377500a^{11}b^3 + 1442025a^{12}b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(2046225352864875b^4 - 4230153389033277ab^4 + 3078613199870661a^2b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1090412569469739a^3b^4 + 191734678251150a^4b^4 - 6491930042850a^5b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-3207292744950a^6b^4 + 904579763850a^7b^4 - 87179618025a^8b^4 + 7262379375a^9b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-230865375a^{10}b^4 + 8454225a^{11}b^4 - 437602985498315b^5 + 909977737682870ab^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-690244478052695a^2b^5 + 254775008026440a^3b^5 - 53044457970150a^4b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(5586729768900a^5b^5 - 11357015670a^6b^5 - 49912543800a^7b^5 + 9518807025a^8b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-422311050a^9b^5 + 24582285a^{10}b^5 + 66696220706115b^6 - 140635945873815ab^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(104089464902220a^2b^6 - 41041143055500a^3b^6 + 8538331086810a^4b^6 - 1105546036770a^5b^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(67259653020a^6b^6 + 1325342340a^7b^6 - 251495685a^8b^6 + 33266625a^9b^6 - 7442156684963b^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(15316877775928ab^7 - 11901188994484a^2b^7 + 4270299001416a^3b^7 - 1002318344370a^4b^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(116087214600a^5b^7 - 9443799540a^6b^7 + 269174520a^7b^7 + 9694845a^8b^7 + 617014151325b^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(-1295202140631ab^8 + 901837698633a^2b^8 - 364964664267a^3b^8 + 66788562375a^4b^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-9924009525a^5b^8 + 520009875a^6b^8 - 25662825a^7b^8 - 38205040445b^9 + 75064195830ab^9)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-58140440475a^2b^9 + 17676240660a^3b^9 - 4270231875a^4b^9 + 331665750a^5b^9 - 31865925a^6b^9)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(1759562805b^{10} - 3613820925ab^{10} + 2150426850a^2b^{10} - 869003850a^3b^{10} + 102327225a^4b^{10})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-15737865a^5b^{10} - 59394517b^{11} + 105400516ab^{11} - 80080078a^2b^{11} + 15757092a^3b^{11})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-3817125a^4b^{11} + 1426425b^{12} - 2806167ab^{12} + 1132131a^2b^{12} - 451269a^3b^{12} - 23065b^{13})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(31850ab^{13} - 23345a^2b^{13} + 225b^{14} - 405ab^{14} - b^{15})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} \left\} + \frac{(a - b - 29)}{(a - b + 1)} \frac{\Gamma(\frac{b+1}{2})}{\Gamma(\frac{a-28}{2})} \times \\
 & \times \left\{ \frac{(9716331072597975 - 5938876097374545a - 5008529359741041a^2 + 6487628849502951a^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \right. \\
 & + \frac{(-3119276152843517a^4 + 859410426286395a^5 - 158335532807893a^6 + 20043813222499a^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-1854935290971a^8 + 121930780205a^9 - 5964037651a^{10} + 200533749a^{11} - 4855487a^{12})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(69545a^{13} - 615a^{14} + a^{15} - 25699223519326395b + 25171279942688730ab)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-2416223309724297a^2b - 6479001690355356a^3b + 3943894121896461a^4b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-1188391890161850a^5b + 222399378231639a^6b - 28728676894728a^7b + 2588486627943a^8b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(-169894944570a^9b + 7802522013a^{10}b - 256988316a^{11}b + 5440071a^{12}b - 72870a^{13}b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(405a^{14}b + 27186344648597079b^2 - 32032729028145123ab^2 + 11386302357850434a^2b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(733537341812478a^3b^2 - 1752277497289123a^4b^2 + 633533549962775a^5b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-125659728215252a^6b^2 + 16438837192564a^7b^2 - 1464979112799a^8b^2 + 93031157115a^9b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-4033380494a^{10}b^2 + 122243758a^{11}b^2 - 2182453a^{12}b^2 + 23345a^{13}b^2 - 15714610310684283b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(20322778632253764ab^3 - 9399215529829782a^2b^3 + 1589873109506676a^3b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(240339705407979a^4b^3 - 160880872128120a^5b^3 + 37894714290636a^6b^3 - 4928138731512a^7b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(453967376427a^8b^3 - 25961358540a^9b^3 + 1124193642a^{10}b^3 - 25610364a^{11}b^3 + 451269a^{12}b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(5701581389114131b^4 - 7726030369046057ab^4 + 4013955046526517a^2b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-970795132030695a^3b^4 + 83600202729150a^4b^4 + 18789810760710a^5b^4 - 5875790236470a^6b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(942471670770a^7b^4 - 74963930625a^8b^4 + 4806325875a^9b^4 - 139028175a^{10}b^4 + 3817125a^{11}b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-1404456293068423b^5 + 1937418830448486ab^5 - 1064214040307691a^2b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(294859652506440a^3b^5 - 41070362418750a^4b^5 + 1727406831780a^5b^5 + 557686323810a^6b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(-86130323640a^7b^5 + 9585440325a^8b^5 - 365482650a^9b^5 + 15737865a^{10}b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(242724293841187b^6 - 344271976774739ab^6 + 188443424215404a^2b^6 - 56118973904220a^3b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(9036668576250a^4b^6 - 737047079370a^5b^6 + 12336525180a^6b^6 + 6606541620a^7b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-412856325a^8b^6 + 31865925a^9b^6 - 31369903498903b^7 + 42658610567352ab^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-24652678843332a^2b^7 + 6928245511560a^3b^7 - 1245809493450a^4b^7 + 114419821320a^5b^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-5157657540a^6b^7 + 13686840a^7b^7 + 25662825a^8b^7 + 2881746912133b^8 - 4152466324811ab^8)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(2134795301001a^2b^8 - 672611134455a^3b^8 + 100119984975a^4b^8 - 11324029185a^5b^8)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(483031395a^6b^8 - 9694845a^7b^8 - 213206657329b^9 + 267836243718ab^9 - 157524817743a^2b^9)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(37508092500a^3b^9 - 7194345375a^4b^9 + 468534150a^5b^9 - 33266625a^6b^9 + 10528402469b^{10})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-15257042593ab^{10} + 6517769778a^2b^{10} - 2097043650a^3b^{10} + 200950425a^4b^{10})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-24582285a^5b^{10} - 457114385b^{11} + 481584324ab^{11} - 285864774a^2b^{11} + 42864900a^3b^{11})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-8454225a^4b^{11} + 11156561b^{12} - 16245307ab^{12} + 4407507a^2b^{12} - 1442025a^3b^{12})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-274253b^{13} + 191)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} \left. \right\} + \frac{2^{(b-1)} \Gamma(\frac{a+b-29}{2})}{\Gamma(b)} \left[\frac{(a-b+29)}{(a-b-1)} \frac{\Gamma(\frac{b+1}{2})}{\Gamma(\frac{a-28}{2})} \right] \times
 \end{aligned}$$



$$\begin{aligned}
 & \times \left\{ \frac{(-9716331072597975 + 25699223519326395a - 27186344648597079a^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \right. \\
 & + \frac{(15714610310684283a^3 - 5701581389114131a^4 + 1404456293068423a^5 - 242724293841187a^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(31369903498903a^7 - 2881746912133a^8 + 213206657329a^9 - 10528402469a^{10})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(457114385a^{11} - 11156561a^{12} + 274253a^{13} - 2465a^{14} + 29a^{15} + 5938876097374545b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-25171279942688730ab + 32032729028145123a^2b - 20322778632253764a^3b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(7726030369046057a^4b - 1937418830448486a^5b + 344271976774739a^6b - 42658610567352a^7b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(4152466324811a^8b - 267836243718a^9b + 15257042593a^{10}b - 481584324a^{11}b + 16245307a^{12}b)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-191226a^{13}b + 3625a^{14}b + 5008529359741041b^2 + 2416223309724297ab^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-11386302357850434a^2b^2 + 9399215529829782a^3b^2 - 4013955046526517a^4b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(1064214040307691a^5b^2 - 188443424215404a^6b^2 + 24652678843332a^7b^2 - 2134795301001a^8b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(157524817743a^9b^2 - 6517769778a^{10}b^2 + 285864774a^{11}b^2 - 4407507a^{12}b^2 + 115101a^{13}b^2)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-6487628849502951b^3 + 6479001690355356ab^3 - 733537341812478a^2b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-1589873109506676a^3b^3 + 970795132030695a^4b^3 - 294859652506440a^5b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(56118973904220a^6b^3 - 6928245511560a^7b^3 + 672611134455a^8b^3 - 37508092500a^9b^3)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(2097043650a^{10}b^3 - 42864900a^{11}b^3 + 1442025a^{12}b^3 + 3119276152843517b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-3943894121896461ab^4 + 1752277497289123a^2b^4 - 240339705407979a^3b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-83600202729150a^4b^4 + 41070362418750a^5b^4 - 9036668576250a^6b^4 + 1245809493450a^7b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-100119984975a^8b^4 + 7194345375a^9b^4 - 200950425a^{10}b^4 + 8454225a^{11}b^4)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-859410426286395b^5 + 1188391890161850ab^5 - 633533549962775a^2b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(160880872128120a^3b^5 - 18789810760710a^4b^5 - 1727406831780a^5b^5 + 737047079370a^6b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-114419821320a^7b^5 + 11324029185a^8b^5 - 468534150a^9b^5 + 24582285a^{10}b^5)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(158335532807893b^6 - 222399378231639ab^6 + 125659728215252a^2b^6 - 37894714290636a^3b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(5875790236470a^4b^6 - 557686323810a^5b^6 - 12336525180a^6b^6 + 5157657540a^7b^6)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-483031395a^8b^6 + 33266625a^9b^6 - 20043813222499b^7 + 28728676894728ab^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-16438837192564a^2b^7 + 4928138731512a^3b^7 - 942471670770a^4b^7 + 86130323640a^5b^7)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-6606541620a^6b^7 - 13686840a^7b^7 + 9694845a^8b^7 + 1854935290971b^8 - 2588486627943ab^8)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(1464979112799a^2b^8 - 453967376427a^3b^8 + 74963930625a^4b^8 - 9585440325a^5b^8)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(412856325a^6b^8 - 25662825a^7b^8 - 121930780205b^9 + 169894944570ab^9 - 93031157115a^2b^9)}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(25961358540a^3b^9 - 4806325875a^4b^9 + 365482650a^5b^9 - 31865925a^6b^9 + 5964037651b^{10})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-7802522013ab^{10} + 4033380494a^2b^{10} - 1124193642a^3b^{10} + 139028175a^4b^{10})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-15737865a^5b^{10} - 200533749b^{11} + 256988316ab^{11} - 122243758a^2b^{11} + 25610364a^3b^{11})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(-3817125a^4b^{11} + 4855487b^{12} - 5440071ab^{12} + 2182453a^2b^{12} - 451269a^3b^{12} - 69545b^{13})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} + \\
 & + \frac{(72870ab^{13} - 23345a^2b^{13} + 615b^{14} - 405ab^{14} - b^{15})}{\prod_{\Omega=1}^{14} \{a - 2\Omega\}} \left\} + \frac{(a - b + 29)}{(a - b - 1)} \frac{\Gamma(\frac{b}{2})}{\Gamma(\frac{a-29}{2})} \times \\
 & \times \left\{ \frac{(-6190283353629375 + 14459713484342175a - 13121113142970855a^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \right. \\
 & + \frac{(6520139954328519a^3 - 2046225352864875a^4 + 437602985498315a^5 - 66696220706115a^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(7442156684963a^7 - 617014151325a^8 + 38205040445a^9 - 1759562805a^{10} + 59394517a^{11})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1426425a^{12} + 23065a^{13} - 225a^{14} + a^{15} + 8055972084035925b - 24912724982942250ab)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(25090282486282455a^2b - 13108577078985156a^3b + 4230153389033277a^4b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-909977737682870a^5b + 140635945873815a^6b - 15316877775928a^7b + 1295202140631a^8b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(-75064195830a^9b + 3613820925a^{10}b - 105400516a^{11}b + 2806167a^{12}b - 31850a^{13}b)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(405a^{14}b + 1616392482200145b^2 + 10303006262294205ab^2 - 15211233519617970a^2b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(9036235922107038a^3b^2 - 3078613199870661a^4b^2 + 690244478052695a^5b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-104089464902220a^6b^2 + 11901188994484a^7b^2 - 901837698633a^8b^2 + 58140440475a^9b^2)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-2150426850a^{10}b^2 + 80080078a^{11}b^2 - 1132131a^{12}b^2 + 23345a^{13}b^2 - 6545235516842331b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(2596215568394844ab^3 + 2788293602201802a^2b^3 - 2763679802745492a^3b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(1090412569469739a^4b^3 - 254775008026440a^5b^3 + 41041143055500a^6b^3 - 4270299001416a^7b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(364964664267a^8b^3 - 17676240660a^9b^3 + 869003850a^{10}b^3 - 15757092a^{11}b^3 + 451269a^{12}b^3)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(4248216825020805b^4 - 3745061321133657ab^4 + 805278615559779a^2b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(236996129977305a^3b^4 - 191734678251150a^4b^4 + 53044457970150a^5b^4 - 8538331086810a^6b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(1002318344370a^7b^4 - 66788562375a^8b^4 + 4270231875a^9b^4 - 102327225a^{10}b^4 + 3817125a^{11}b^4)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1462132132021015b^5 + 1500877287187498ab^5 - 592074582718251a^2b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$



$$\begin{aligned}
 & + \frac{(81510903588600a^3b^5 + 6491930042850a^4b^5 - 5586729768900a^5b^5 + 1105546036770a^6b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-116087214600a^7b^5 + 9924009525a^8b^5 - 331665750a^9b^5 + 15737865a^{10}b^5)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(320488415412165b^6 - 352103134363795ab^6 + 152005752412020a^2b^6 - 35627232576540a^3b^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(3207292744950a^4b^6 + 11357015670a^5b^6 - 67259653020a^6b^6 + 9443799540a^7b^6)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-520009875a^8b^6 + 31865925a^9b^6 - 48202739351767b^7 + 53414874649352ab^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-25039023203844a^2b^7 + 5812690315320a^3b^7 - 904579763850a^4b^7 + 49912543800a^5b^7)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-1325342340a^6b^7 - 269174520a^7b^7 + 25662825a^8b^7 + 5162979107715b^8 - 5770777441211ab^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(2577581061327a^2b^8 - 681267356055a^3b^8 + 87179618025a^4b^8 - 9518807025a^5b^8)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(251495685a^6b^8 - 9694845a^7b^8 - 400775348545b^9 + 432319504074ab^9 - 199541321583a^2b^9)}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(44069719500a^3b^9 - 7262379375a^4b^9 + 422311050a^5b^9 - 33266625a^6b^9 + 22625638035b^{10})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-23960048385ab^{10} + 9686890590a^2b^{10} - 2398342050a^3b^{10} + 230865375a^4b^{10})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \\
 & + \frac{(-24582285a^5b^{10} - 919973873b^{11} + 894640604ab^{11} - 369359718a^2b^{11} + 59377500a^3b^{11})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} +
 \end{aligned}$$

$$+ \frac{(-8454225a^4b^{11} + 26244855b^{12} - 24237707ab^{12} + 7237269a^2b^{12} - 1442025a^3b^{12} - 498365b^{13})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} + \left. \frac{(370678ab^{13} - 115101a^2b^{13} + 5655b^{14} - 3625ab^{14} - 29b^{15})}{\prod_{\Phi=1}^{15} \{a - (2\Phi - 1)\}} \right\}$$

On simplification, we get the main formula.

REFERENCES RÉFÉRENCES REFERENCIAS

1. Abramowitz, Milton.,A and Stegun, Irene; *Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables*. National Bureau of Standards, 1970.
2. Arora, Asish, Singh, Rahul, Salahuddin. ; Development of a family of summation formulae of half argument using Gauss and Bailey theorems, *Journal of Rajasthan Academy of Physical Sciences.*, 7(2008), 335-342.
3. Prudnikov, A. P., Brychkov, Yu. A. and Marichev, O.I.; *Integrals and Series Vol. 3: More Special Functions*. Nauka, Moscow, 1986. Translated from the Russian by G.G. Gould, Gordon and Breach Science Publishers, New York, Philadelphia, London, Paris, Montreux, Tokyo, Melbourne, 1990.
4. Salahuddin. ; Evaluation of a Summation Formula Involving Recurrence Relation, *Gen. Math. Notes.*, 2(2010), 42-59.
5. Salahuddin. ; Two Summation Formulae Based On Half Argument Associated To Hypergeometric function , *Global Journal of Science Frontier Reseach.*, 10(2010), 08-19.
6. Salahuddin. ; Evaluation of Certain Summation Formulae Involving Gauss Theorem , *Global Journal of Mathematical Sciences: Theory and Practical.*, 10(2010), 309-316.
7. Salahuddin. ; A Summation Formula Related To Bailey Theorem, *Global Journal of Science Frontier Reseach.*, 11(2011), 53-67.
8. Salahuddin. ; On Certain Summation Formulae based on half argument associated to hypergeometric function , *International Journal of Mathematical Archieve.*, 2(2011), 255-257.

