

# Formulas for sum of powers of consecutive integers derive from certain family of finite sums involving higher powers of (inverse)binomial coefficients

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One of the main purposes of this presentation, which contains very interesting and applicable new results and will also be converted into an article, is to surval generating functions in terms of hypergeometric function and logarithm function for finite sums involving higher powers of inverse binomial coefficients, denoted by  $\mathcal{S}_v(n; \lambda, p)$  (cf. for detal see [1]).  $\mathcal{S}_v(n; \lambda, p)$  is a polynomial with respect to  $\lambda$ . Its degree is  $n$ . The second main purposes of this presentation is to give some applications of the polynomials  $\mathcal{S}_v(n; \lambda, p)$ . By using these applications, we derive many formulas for sums of powers of consecutive integers involving the Bernoulli and Euler-type numbers and polynomials, the Stirling numbers, the (alternating) harmonic numbers, the Apostol-type numbers and polynomials. In addition, we also give some remarks and observations on these results.

## References

- [1] Y. Simsek, Generating functions for series involving higher powers of inverse binomial coefficients and their applications, preprint (2023)