

FACTORIZATION OF FACTORIALS AND A RESULT OF HARDY AND RAMANUJAN

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Abstract. We obtain an explicit approximation for the sum of prime powers in the factorization of n! into prime numbers. This reproves, as more as gives an explicit version to, a well-known result of Hardy and Ramanujan concerning the summation $\sum_{k \leq n} \Omega(k)$.

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REFERENCES

- [1] M. AVALIN CHARSOOGHI, Y. AZIZI, M. HASSANI AND L. MOLLAZADEH-BEIDOKHTI, On a result of Hardy and Ramanujan, Sarajevo J. Math. 4, 17 (2008), 147–153.
- [2] S. R. FINCH, Mathematical constants, Encyclopedia of Mathematics and its Applications, 94, Cambridge University Press, Cambridge, 2003.
- [3] G. HARDY AND S. RAMANUJAN, The normal number of prime factors of a number n, Quart. J. Math. 48 (1917), 76–92.
- [4] M. HASSANI, *Equations and Inequalities Involving* $v_p(n!)$, Journal of Inequalities in Pure and Applied Mathematics (JIPAM) **6**, 2 (2005), Article 29.
- [5] J. BARKLEY ROSSER & L. SCHOENFELD, Approximate Formulas for Some Functions of Prime Numbers. Illinois J. Math. 6 (1962), 64–94.