

DECLARATION BY THE CANDIDATE

I, Abhishek Sarma, hereby declare that the subject matter in this thesis entitled, *‘Sign patterns and congruences of certain infinite products involving the Rogers-Ramanujan continued fraction, arithmetic properties of some partition functions, and parity biases in integer partitions’* is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other university/institute.

This thesis is being submitted to the Tezpur University for the degree of Doctor of Philosophy in Mathematical Sciences.

Date: July 30, 2025
Place: Tezpur, Assam, India


Signature of the Candidate

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CERTIFICATE OF THE SUPERVISOR

This is to certify that the thesis entitled, '*Sign patterns and congruences of certain infinite products involving the Rogers-Ramanujan continued fraction, arithmetic properties of some partition functions, and parity biases in integer partitions*' submitted to the School of Sciences of Tezpur University in partial fulfilment for the award of the degree of Doctor of Philosophy in Mathematical Sciences is a record of research work carried out by Mr. Abhishek Sarma under my supervision and guidance. All the help received by him from various sources have been duly acknowledged. No part of this thesis has been submitted elsewhere for award of any other degree.

Date: July 30, 2025

Place: Tezpur

Nayandeep Deka Baruah

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