

Some new Ramanujan–Kohlberg identities

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Abstract: Ramanujan's identities involving the generating functions for $p(5n + 4)$ and $p(7n + 5)$ are considered to be among his most beautiful results. These were shown by Kolberg to be special cases of a larger class of relationships expressing generating functions for $p(mn + j)$ in terms of eta quotients. The form of these identities is prevalent throughout the theory of partitions. They are useful in the verification of families of partition congruences, as well as in the study of certain conjectures in the theory of modular functions. In 2014 Silviu Radu developed an algorithm to compute the Ramanujan-Kolberg identities inherent in various arithmetic functions. We have fully implemented this algorithm with Mathematica. We will show some interesting examples found using our implementation, with a focus on partition congruences. We include some new results, as well as some interesting improvements on previous results.