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Title: Local distribution of the parts of unequal partitions in arithmetic progressions I

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In [**?**], András Sárközy and the authors proved that for almost all unequal partitions of an integer n, the parts are evenly distributed in residue classes modulo d for $d = o(n^{1/2})$. In this paper, we study very precisely the local distribution in arithmetic progressions of the parts of unequal partitions. We obtain some asymptotic formulae for the number of unequal partitions of n with exactly N_r parts congruent to r mod d, $1 \leq r \leq d$. Our results show that $(N_1, \ldots, N_d)$ behaves like a random Gaussian vector. This illustrates the fact that the distribution of the parts of unequal partitions in residue classes is much more uniform that in the case of unrestricted partitions.

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