Future research

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(1) On the relation between 2-Calabi-Yau triangulated categories and generalized q-deformed rational numbers.

This study considers the $(n+1)$-braid group action on the 2-Calabi-Yau triangulated category $\mathcal{C}_n$ and aims to clarify the combinatorial structure of spherical objects on $\mathcal{C}_n$. Specifically, we construct generalized q-deformed rational numbers (q-deformation of rational points in an $(n-1)$-dimensional projective space). I will clarify the relation between the $(n+1)$-braid group action on $\mathcal{C}_n$ and the $PSL_q(n,Z)$-action on the set of generalized q-deformed rational numbers and extend our previous results on q-deformed rational numbers to generalized q-deformed rational numbers.

(2) Special values of the q-deformed modular group and arithmetic decomposition problem for q-deformed rational numbers

For an n-th primitive root of unity ζ_n, we define a kind of group which gives by taking $q=\zeta_n$ for PSL$_q$(2,**Z**). We will study its construction. On the other hand, it is conjectured that if the denominator of an irreducible fraction is prime, the denominator polynomial of its q-deformed rational number is irreducible in $Z[q]$, and moreover, the same holds for the left q-deformed rational numbers. This has been checked by computer for primes below 730, but in general it remains open. As an example for the case left q-deformed rational numbers, for a prime p, $q^p+q^{p-2}+\cdots+q+1$ is expected to be irreducible in $Z[q]$, we resolved several cases. We will consider the reminder cases and the case of q-deformed rational numbers.