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A NOTE ON q-ANALOGUE OF CATALAN NUMBERS ASSOCIATED WITH q-CHANGHEE NUMBERS

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Abstract: In this paper, we study q-analogue of Catalan numbers and polynomials by using p-adic q-integral on $\mathbb{Z}_p$. We investigate some properties of these numbers and polynomials. In addition, we define q-analogue of $\frac{1}{2}$-Changhee numbers by using p-adic q-integral on $\mathbb{Z}_p$ and derive their explicit expressions and some identities involving them.

Keywords and Phrases: Catalan numbers, $\frac{1}{2}$-Changhee numbers, q-Catalan numbers, q-analogue of $\frac{1}{2}$-Changhee numbers, q-Euler numbers.

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1. Introduction

Let p be a fixed odd prime number. Throughout this paper, $\mathbb{Z}_p$, $\mathbb{Q}_p$ and $\mathbb{C}_p$ will denote the ring of p-adic integers, the filed of p-adic rational numbers and the completion of an algebraic closure of $\mathbb{Q}_p$. The p-adic norm $|\ .\ |_p$ is normalized by $|\ p\ |_p = \frac{1}{p}$. Let $C(\mathbb{Z}_p)$ be the space of continuous function on $\mathbb{Z}_p$. Let q be an indeterminate in $\mathbb{C}_p$ with $|\ 1-q\ |_p < 1$ and q-extension of x is defined by $[x]_q = \frac{1-q^x}{1-q}$.