3-GDDs with block size 4 and 3 groups

Dinesh G. Sarvate, College of Charleston, Charleston, USA*
Pramod Shinde, N. Wadia College, S. Phule Pune University, India

Necessary conditions for the existence of a 3-GDD$(n, 3, k, \Lambda_1, \Lambda_2)$ are obtained and several infinite families of 3-GDDs are constructed. In particular, we prove that necessary conditions are sufficient for the existence of 3-GDD$(n, 3, 4, \Lambda_1, \Lambda_2)$ for $n \equiv 0 \pmod 4$ and $\Lambda_2 \equiv 0 \pmod 3$. When $\Lambda_2 \equiv 1, 2 \pmod 3$, then the necessary conditions are sufficient for the existence except when $n \equiv 6 \pmod{12}$ and $\Lambda_2 \equiv 1 \pmod 3$, $n \neq 6$.

Keywords: t-designs, 3-$(v, 4, \lambda)$, 3-GDDs, GDDs