J. Adv. Math. Stud.
Vol. **15**(2022), No. 3, 338-347
http://journal.fairpartners.ro

DECOMPOSITION DIMENSION OF SOME CLASS OF TREES

REJI T AND RUBY R

ABSTRACT. For an ordered k-decomposition $\mathscr{D} = \{G_1, G_2, \ldots, G_k\}$ of a connected graph $G = (V, E)$, the $\mathscr{D}$-representation of an edge e is the k-tuple

$$\gamma(e/\mathscr{D}) = (d(e, G_1), d(e, G_2), \ldots, d(e, G_k)),$$

where $d(e, G_i)$ represents the distance from e to G_i. A decomposition $\mathscr{D}$ is resolving if every two distinct edges of G have distinct representations. The minimum k for which G has a resolving k-decomposition is its decomposition dimension $\operatorname{dec}(G)$. In this paper, the decomposition dimension of broom graph, double broom graph and upper bounds for the decomposition dimension of banana tree graph and fire cracker graph are determined.

REFERENCES

[1] G. Chartrand, D. Erwin, M. Raines and P. Zhang: *The decomposition dimension of graphs*, Graphs Combin., **17**(2001), 599-605.
[2] Wen-Chin Chen, Hsueh-I Lu and Yeong-Nan Yeh: *Operations of interlaced trees and graceful trees*, Southeast Asian Bull. Math., **21**(1997), No. 4, 337-348.
[3] H. Enomoto: *Upper bound of decomposition dimension of a graph*, Congr. Numer., **145**(2000), 157-160.
[4] H. Enomoto and T. Nakamigawa: *On the decomposition dimension of trees*, Discrete Math., **252**(2002), 219-225.
[5] M. Hagita, A. Kundgen and D.B. West: *Probabilistic methods for decomposition dimension of graphs*, Graphs Combin., **19**(2003), 493-503.
[6] F. Harary and R.A. Melter: *On the metric dimension of a graph*, Ars Combin., **15**(2008), 191-195.
[7] Mark Johnson: *Structure-activity maps for visualizing the graph variables arising in drug design*, J. Biofarm. Stat., **3**(1993), No. 2, 203-236.
[8] V. Saenpholphat and P. Zhang: *Connected resolving decompositions in graphs*, Math. Bohem., **128**(2003), 121-136.
[9] P.J. Slater: *Leaves of trees*, Congr. Numer., **14**(1975), 549-559.
[10] P.J. Slater: *Dominating and reference sets in graphs*, J. Math. Phys. Sci., **22**(1988), No. 4, 445-455.

Received: February 03, 2022. *Revised:* July 12, 2022.
2010 *Mathematics Subject Classification*: 05C05, 05C70.
Key words and phrases: Graph decomposition, star, broom graph, double broom graph, fire cracker graph, banana tree graph.

Department of Mathematics
Government College Chittur
Palakkad,
Kerala, India – 678104
E-mail address: rejiaran@gmail.com

Department of Mathematics
Government College Chittur
Palakkad,
Kerala, India – 678104
E-mail address: rubymathpkd@gmail.com (Corresponding author)