

## ABSTRACT

In this thesis we study interpolation and extremal problems for the connectivity and the domination numbers of connected graphs of order  $n$  and size  $m$ .

Let  $\kappa(G)$  be the vertex-connectivity of a graph  $G$ ,

$\lambda(G)$  be the edge-connectivity of a graph  $G$ ,

$\gamma(G)$  be the domination number of a graph  $G$ ,

$\gamma'(G)$  be the edge domination number of a graph  $G$ ,

and  $\mathcal{CG}(m, n)$  be the class of all nonisomorphic connected graphs of order  $n$  and size  $m$ .

We show that for  $f \in \{\kappa, \lambda, \gamma, \gamma'\}$ , the values of  $f(G)$  where  $G \in \mathcal{CG}(m, n)$  completely cover a line segment  $[a, b]$  of positive integers. Then we say that  $f$  is an interpolation graph parameter with respect to  $\mathcal{CG}(m, n)$ . Thus for a graph parameter  $f$ , two invariants  $a(f)$  and  $b(f)$  where

$$a(f) = \min\{f(G) : G \in \mathcal{CG}(m, n)\} \text{ and}$$

$$b(f) = \max\{f(G) : G \in \mathcal{CG}(m, n)\}, \text{ arise naturally.}$$

The extremal values  $a(f)$  and  $b(f)$  are obtained for all  $f \in \{\kappa, \lambda, \gamma, \gamma'\}$ .

We also find the minimum and maximum values for all  $f \in \{\kappa, \lambda, \gamma, \gamma'\}$ .