

# Chapter 15

## Global Stability Analysis Through Graph Theory for Smartphone Usage During COVID-19 Pandemic



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**Abstract** During the pandemic due to coronavirus disease-19 (COVID-19), technology is regarded as a boon as well as a curse to human life which has a great impact on surroundings, people and the society. One of the innovative, however, perilous (if misused) inventions of humans is the smartphone which is becoming more and more alarmingly common yet an urgent question to be addressed. A wide application of smartphone technology is observed during this pandemic. It has both positive as well as negative impact on the prominent areas which include education, business, health, social life and furthermore. Moreover, the impact of such an addiction is observed not only among youngsters but has influenced all age groups. This scenario is modelled in this research through non-linear ordinary differential equations, where individuals susceptible to smartphone use will be either positively or negatively infected/addicted, may suffer from health issues procuring medication. Threshold is calculated using the next generation matrix method. Stability analysis is done using graph theory, and for the validation of data, numerical simulation is carried out. This study gives results explaining positive and negative issues on health due to excessive use of smartphone.

**Keywords** COVID-19 · Smartphone use/addiction · Positively or negatively infected · Health issues · Threshold · Stability · Graph theory

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