Title : Connectivity of K-Distance Product Graphs.

Author(s) :
1. Nuntida Chairungruang — **Student ID :** 650510575
2. — **Student ID :**
3. — **Student ID :**

Major : Mathematics

Advisor(s) :
1. Associate Professor Dr. Sayan Panma
2.
3.

Type of presentation* *(choose 1)* **:**
- ☐ **Oral Presentation** (เฉพาะ ตัวแทนนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
- ☑ **Poster** (กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
- ☐ **Cooperative Education** (กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

This research investigates the connectivity properties of the k*-distance product graph in order to determine its vertex connectivity* $\kappa(G)$ *and edge connectivity* $\kappa'(G)$.

The study is motivated by fundamental concepts in graph theory, including connected graphs, vertex connectivity, and edge connectivity.

Let $G = (V, E)$ *be a graph. If* G *is not a complete graph, the* vertex connectivity *of* G *is defined as the minimum number of vertices whose removal disconnects* G .

If G *is a complete graph, its connectivity is defined as*

$$\kappa(G) = |V| - 1$$

The vertex connectivity of G *is denoted by* $\kappa(G)$.

Similarly, for a graph $G = (V, E)$ *with* $|V| > 1$, *the* edge connectivity *of* G *is defined as the minimum number of edges whose removal disconnects the graph.*

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

If $|V| = 1$*, the edge connectivity is defined to be* 0*.*
The edge connectivity of G *is denoted by* $\kappa'(G)$*.*

Let G *and* H *be graphs.*
The k*-distance product of* G *and* H*, denoted by* $G \otimes_k H$*, is defined as follows.*

The vertex set *is* $V(G \otimes_k H) = V(G) \times V(H)$*.*

The edge set *is* $E(G \otimes_k H) = \{\big((u,x),(v,y)\big) \mid x = y \text{ and } 1 \leq d_G(u,v) \leq k \text{ or } u = v \text{ and } 1 \leq d_H(x,y) \leq k\}$

That is, two vertices (u,x) *and* (v,y) *are adjacent in* $G \otimes_k H$ *if either*
the second components are equal and the distance between u *and* v *in* G *is at most* k*,*
or the first components are equal and the distance between x *and* y *in* H *is at most* k*.*

The Cartesian product of graphs serves as a foundational concept before extending to the k*-distance product.*
For two graphs G *and* H*, the Cartesian product has vertex set*

$$V(G) \times V(H),$$

and edges are defined by adjacency in exactly one coordinate while the other coordinate remains fixed.

The k*-distance product generalizes this concept by replacing adjacency with a distance condition not exceeding* k *in one of the component graphs.*

This study aims to determine the vertex connectivity $\kappa(G \otimes_k H)$ *and the edge connectivity* $\kappa'(G \otimes_k H)$*, thereby extending classical connectivity results to* k*-distance product graphs.*

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

Title name guide.

ADVISOR title name / แปลไทย	
Professor Dr.	ศาสตราจารย์ ดร.
Professor	ศาสตราจารย์
Associate Professor Dr.	รองศาสตราจารย์ ดร.
Associate Professor	รองศาสตราจารย์
Assistant Professor Dr.	ผู้ช่วยศาสตราจารย์ ดร.
Assistant Professor	ผู้ช่วยศาสตราจารย์
Dr.	ดร.
Lecturer	อาจารย์
Mrs.	นาง
Ms.	นางสาว
Mr.	นาย

Major name guide.

SCIENCE MAJOR name / แปล	
Biology	ชีววิทยา
Microbiology	จุลชีววิทยา
Zoology	สัตววิทยา
Biochemistry and Biochemical Technology *or* Biochemistry and Biochemical Innovation	ชีวเคมีและชีวเคมีเทคโนโลยี *หรือ* ชีวเคมีและชีวเคมีนวัตกรรม
Chemistry	เคมี
Industrial Chemistry	เคมีอุตสาหกรรม
Materials Science	วัสดุศาสตร์
Physics	ฟิสิกส์
Computer Science	วิทยาการคอมพิวเตอร์
Data Science	วิทยาการข้อมูล
Mathematics	คณิตศาสตร์
Statistics	สถิติ
Gemology	อัญมณีวิทยา
Geology	ธรณีวิทยา

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

Environmental Science	วิทยาศาสตร์สิ่งแวดล้อม

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*