

Centrality and spectral radius in dynamic communication networks

$\mathcal{G}$ is a sequence of graphs $\mathcal{G}_1, \mathcal{G}_2, \dots, \mathcal{G}_K$ with n nodes. Let $\mathcal{D}_i$ be the degree matrix, $\mathcal{M}_i$ the adjacency matrix, $\mathcal{H}_i$ the Laplacian matrix, and $\mathcal{B}_i$ the transition matrix of $\mathcal{G}_i$. We consider the sequence of matrices $\{\mathcal{D}_i + \mathcal{M}_i + \mathcal{H}_i + \mathcal{B}_i\}_{i=1}^K$.

Abstract. We study the centrality and spectral radius of the sequence of matrices $\{\mathcal{D}_i + \mathcal{M}_i + \mathcal{H}_i + \mathcal{B}_i\}_{i=1}^K$ in the context of dynamic communication networks. We show that the spectral radius of the sequence of matrices is bounded by the maximum degree of the nodes in the sequence of graphs. We also show that the centrality of the nodes in the sequence of graphs is bounded by the maximum degree of the nodes in the sequence of graphs. Finally, we show that the spectral radius of the sequence of matrices is bounded by the maximum degree of the nodes in the sequence of graphs.

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12.4

: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200.

1 Introduction

We consider a sequence of graphs $\mathcal{G}_1, \mathcal{G}_2, \dots, \mathcal{G}_K$ with n nodes. Let $\mathcal{D}_i$ be the degree matrix, $\mathcal{M}_i$ the adjacency matrix, $\mathcal{H}_i$ the Laplacian matrix, and $\mathcal{B}_i$ the transition matrix of $\mathcal{G}_i$. We consider the sequence of matrices $\{\mathcal{D}_i + \mathcal{M}_i + \mathcal{H}_i + \mathcal{B}_i\}_{i=1}^K$. We show that the spectral radius of the sequence of matrices is bounded by the maximum degree of the nodes in the sequence of graphs. We also show that the centrality of the nodes in the sequence of graphs is bounded by the maximum degree of the nodes in the sequence of graphs. Finally, we show that the spectral radius of the sequence of matrices is bounded by the maximum degree of the nodes in the sequence of graphs.

(1) $\mathcal{G}_1$ is a graph with n nodes and m edges. Let $\mathcal{D}_1$ be the degree matrix, $\mathcal{M}_1$ the adjacency matrix, $\mathcal{H}_1$ the Laplacian matrix, and $\mathcal{B}_1$ the transition matrix of $\mathcal{G}_1$. We consider the sequence of matrices $\{\mathcal{D}_i + \mathcal{M}_i + \mathcal{H}_i + \mathcal{B}_i\}_{i=1}^K$. We show that the spectral radius of the sequence of matrices is bounded by the maximum degree of the nodes in the sequence of graphs. We also show that the centrality of the nodes in the sequence of graphs is bounded by the maximum degree of the nodes in the sequence of graphs. Finally, we show that the spectral radius of the sequence of matrices is bounded by the maximum degree of the nodes in the sequence of graphs.

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[illegible]

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2 Relaxed Communicability

2.2 $\mathbf{B}$

$$A_i$$

$$(I-\alpha A_i)^{-1} \sum_{k=0}^1 \alpha^k A_i^k \tag{}$$

$$\alpha < \frac{1}{\max(A_i)}, i = 0, \dots, M$$

$l \in \mathbb{N}$ p q p l $\mathbb{R}$, α ll l b l
 1 q p l q q p l $\mathbb{R}$ q p q $\mathbb{R}$
 $, \dots$ q l q $\mathbb{R}$, b l q
 b l q , l l $\mathbb{R}$ p l q p q $\mathbb{R}$
 ppl , l l α $()$ $\mathbb{R}$, l b b ll -
 q l pl α q A_i l q 2 - A_i l .
 $\mathbb{R}$ p ll p q n , q p q ll
 $, pp$ q b , $\mathbb{R}$ l A_i . l q
 b l pl q ll A_i . ll $\mathbb{R}$ p , Q b
 b q q l $()$ $\mathbb{R}$ p q α q pl $\mathbb{R}$ A $\frac{A}{kAk}$.

2.4 i l i

q q b p q $\mathbb{R}$ p q l q
 l b q b p $\mathbb{R}$ p q $\mathbb{R}$ l q
 b p q $\mathbb{R}$ q $A_{i_1}, \dots, A_{i_2}$
 p b l q $\mathbb{R}$ q q q l q $-$
 b l q . k , p Q_k , b -
 q q l $\mathbb{R}$ 0 2 2 0 q $(\mathbb{R})$ $\mathbb{R}/$. 1 0 q $($ $(/)$ 2 $()$ $- 2$. 1 0 $)-2$ 0 q $($ 2 $($ $\mathbb{R}$

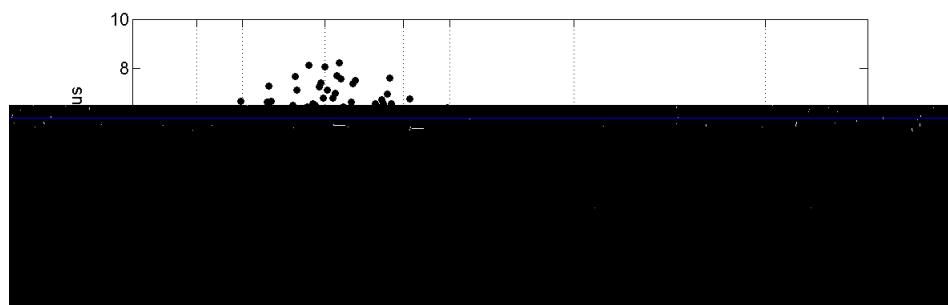


Fig. 2. MI, λ , μ , A_1 , A_{365} , λ .



Fig. 3. MI : A l . l e l s . j (l , l , l , l),
32.

[illegible]

l	$-\left(\frac{1}{l}\right)$	$-\left(\frac{1}{l}\right)$
10	71	21
45	35	25
59	85	28
71	71	21

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