PelegとRubinovich [23、22]によって暗黙的に導入され、Das Sarmaら[27、26]によって明示的かつ正式に定義され, 距離計算[1、14、17]、最小全域木[22、12、26]、最小カット[15、26]、最小頂点被覆[8]、スパナの構築と検証[6、7]、部分グラフ検出[11、13、16]([13]:2つ目の論文)、近似最大クリーク[10](最初の論文)、分散最適化の硬度[4](もう一つの論文)、分散ランダムウォーク[20]、その他（論文の完全なリストは実行不可能です）など,基本的なグラフ問題の多くの下限を証明するために使用されました。

暗黙的に導入

[23] David Peleg and Vitaly Rubinovich.

A near-tight lower bound on the time complexity of distributed minimum-weight spanning tree construction. 2000.

[22] David Peleg and Vitaly Rubinovich.

A near-tight lower bound on the time complexity of distributed MST construction. 1999.

明示的に定義

[27] Atish Das Sarma, Stephan Holzer, Liah Kor, Amos Korman, Danupon Nanongkai, Gopal Pandurangan,

David Peleg, and Roger Wattenhofer.

Distributed verification and hardness of distributed approximation. 2012.

[26] Atish Das Sarma, Stephan Holzer, Liah Kor, Amos Korman, Danupon Nanongkai, Gopal Pandurangan, David Peleg, and Roger Wattenhofer.

Distributed verification and hardness of distributed approximation. 2011.

距離計算

[1] Amir Abboud, Keren Censor-Hillel, and Seri Khoury. 2016 ←あり

Near-linear lower bounds for distributed distance computations, even in sparse networks. [14] Silvio Frischknecht, Stephan Holzer, and Roger Wattenhofer. 2012

Networks cannot compute their diameter in sublinear time.

[17] Stephan Holzer and Nathan Pinsker. 2015

Approximation of distances and shortest paths in the broadcast congest clique.

最小全域木

[22],[26]

[12] Michael Elkin. 2006

An unconditional lower bound on the time-approximation trade-off for the distributed minimum spanning tree problem.

最小カット

[26]

[15] Mohsen Ghaari and Fabian Kuhn. 2013

Distributed minimum cut approximation. ←あり

最小頂点被覆

[8] Keren Censor-Hillel, Seri Khoury, and Ami Paz. 2017 ←北村さん

Quadratic and near-quadratic lower bounds for the CONGEST model.

スパナの構築と検証

[6] Keren Censor-Hillel and Michal Dory. 2018

Distributed spanner approximation.

[7] Keren Censor-Hillel, Telikepalli Kavitha, Ami Paz, and Amir Yehudayo. 2016

Distributed construction of purely additive spanners. ←あり

部分グラフ検出

[11] Andrew Drucker, Fabian Kuhn, and Rotem Oshman. 2014

On the power of the congested clique model.

[13] Orr Fischer, Tzlil Gonen, Fabian Kuhn, and Rotem Oshman. 2018

Possibilities and impossibilities for distributed subgraph detection. ←2つ目の論文

[16] Tzlil Gonen and Rotem Oshman. 2017

Lower bounds for subgraph detection in the CONGEST model.

近似最大クリーク

[10] Artur Czumaj and Christian Konrad. 2018

Detecting cliques in CONGEST networks. (最初の論文)

分散最適化の硬度

[4] Nir Bachrach, Keren Censor-Hillel, Michal Dory, Yuval Efron, Dean Leitersdorf, and Ami Paz. 2019

Hardness of distributed optimization. (もう一つの論文)

分散ランダムウォーク[20] Danupon Nanongkai, Atish Das Sarma, and Gopal Pandurangan. A tight unconditional lower bound on distributed randomwalk computation. 2011.