2024年度　リポジトリ担当者の基礎知識研修　実務紹介(1)

学術コミュニケーションと機関リポジトリの基礎知識

2024年9月3日

JPCOAR イベント運営作業部会

本講の内容

1. 学術コミュニケーションの基礎知識

① 学術雑誌とはどのようなものか
② 論文とはどのようなものか
③ オープンアクセスとはどういうことか

2. 機関リポジトリの基礎知識

① 機関リポジトリとは
② オープンアクセスに関する政策と動向
③ 機関リポジトリ業務担当者の役割

1. 学術コミュニケーションの基礎知識

①学術雑誌とはどのようなものか

②論文とはどのようなものか

③オープンアクセスとはどういうことか

「1. 学術コミュニケーションの基礎知識」の内容は、杉田 茂樹,「学術コミュニケーションの基礎知識」, 2020 を基にしています。


科学的発見／知見
それを生み出したのが私だと世界に認知してほしい
その科学的真価を認めてほしい
世に広まってほしい
後世にも伝えたい
“Smaismrmilmepoetalevmibunenugttaviras”
altissimum planetam tergeminum observari.

“学術雑誌の4機能”

それを生み出したのが私だと世界に認知してほしい

論文の先取権の確立

査読による質の保証

その科学的真価を認めてほしい

世に広まってほしい

知見を世に知らせる

知見を後世に伝える

後世にも伝えたい

ヘンリー・オルデンバーグ氏の書簡（1664～1665）より。同氏は、世界最古の学術雑誌と言われるイギリス王立協会「フィロソフィカル・トランザクション」（1665～）創刊時の事務総長

一般的な出版物

- 著者・作者は原稿料や印税などを受け取り、収入とする

学術雑誌

むしろ著者がお金（例えば20万円とか）を払うケースもある。

- 著者は対価を得ない
  - 研究論文執筆・公開の目的は金銭でなく、著作が広く行き渡り、科学の発展に寄与すること
  - 収入は所属機関の給与など。学術的名声を得て、ポストを獲得することが間接的に収入に寄与

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1. 学術コミュニケーション　②論文とはどのようなものか

Nawata S, Maki A, Hikihara T. (2018)
Power packet transferability via symbol propagation matrix.
Proc. R. Soc. A 474: 20170552. http://dx.doi.org/10.1098/rspa.2017.0552

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Cite this article: Nawata S, Maki A, Hikihara T. 2018 Power packet transferability via symbol propagation matrix. *Proc. R. Soc. A* 474: 20170552. http://dx.doi.org/10.1098/rspa.2017.0552

Received: 21 August 2017
Accepted: 17 April 2018

Subject Areas:
electrical engineering, applied mathematics, systems theory

Keywords:
power packet, router, network flow problem, electrical energy network

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Power packet transferability via symbol propagation matrix

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A power packet is a unit of electric power composed of a power pulse and an information tag. In Shannon's information theory, messages are represented by symbol sequences in a digitized manner. Referring to this formulation, we define symbols in power packetization as a minimum unit of power transferred by a tagged pulse. Here, power is digitized and quantized. In this paper, we consider packetized power in networks for a finite duration, giving symbols and their energies to the networks. A network structure is defined using a graph whose nodes represent routers, sources and destinations. First, we introduce the concept of a symbol propagation matrix (SPM) in which symbols are transferred at links during unit times. Packetized power is described as a network flow in a spatio-temporal structure. Then, we study the problem of selecting an SPM in terms of transferability, that is, the possibility to represent given energies as sources and destinations during the finite duration. To select an SPM, we consider a network flow problem of packetized power. The problem is formulated as an M-convex submodular flow problem which is a solvable generalization of the minimum cost flow problem. Finally, through examples, we verify that this formulation provides reasonable packetized power.

1. Introduction

Electric power has been considered as a continuous flow based on circuit theory, in which power flow is governed by Kirchhoff Laws and Tellegen's theorem [1]. The circuit theory can be generalized to represent various nonlinear complex systems in the system topology with energy dissipation and energy storage as a network

References

1. Desoer CA, Kuh ES. 1969 *Basic circuit theory*, ch. 9. New York, NY: McGraw-Hill.
2. Oster G, Perelson A, Kaichalsky A. 1971 Network thermodynamics. *Nature* **234**, 393–399. (doi:10.1038/234393a0)
3. Shannon CE. 1948 A mathematical theory of communication. *Bell Syst. Tech. J.* **27**, 379–423 and 623–656. (doi:10.1002/j.1538-7305.1948.tb01338.x)
4. Massey JL. 1984 Information theory: the copernican system of communications. *IEEE Commun. Mag.* **22**, 26–28. (doi:10.1109/MCOM.1984.1091871)
5. Kleinrock L. 2010 An early history of the Internet [history of communications]. *IEEE Commun. Mag.* **48**, 26–36. (doi:10.1109/MCOM.2010.5534584)
6. Takuno T, Koyama M, Hikihara T. 2010 In-home power distribution systems by circuit switching and power packet dispatching. In *Proc. 1st IEEE Int. Conf. Smart Grid Commun., Gaithersburg, MD, 4–6 October*, pp. 427–430. Piscataway, NJ: IEEE.
7. Takahashi R, Takuno T, Hikihara T. 2012 Estimation of power packet transfer properties on indoor power line channel. *Energies* **5**, 2141–2149. (doi:10.3390/en5072141)

(参考)この論文の内容について興味のある方は以下をどうぞ

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雑誌の名前

この論文を表す記号「DOI」

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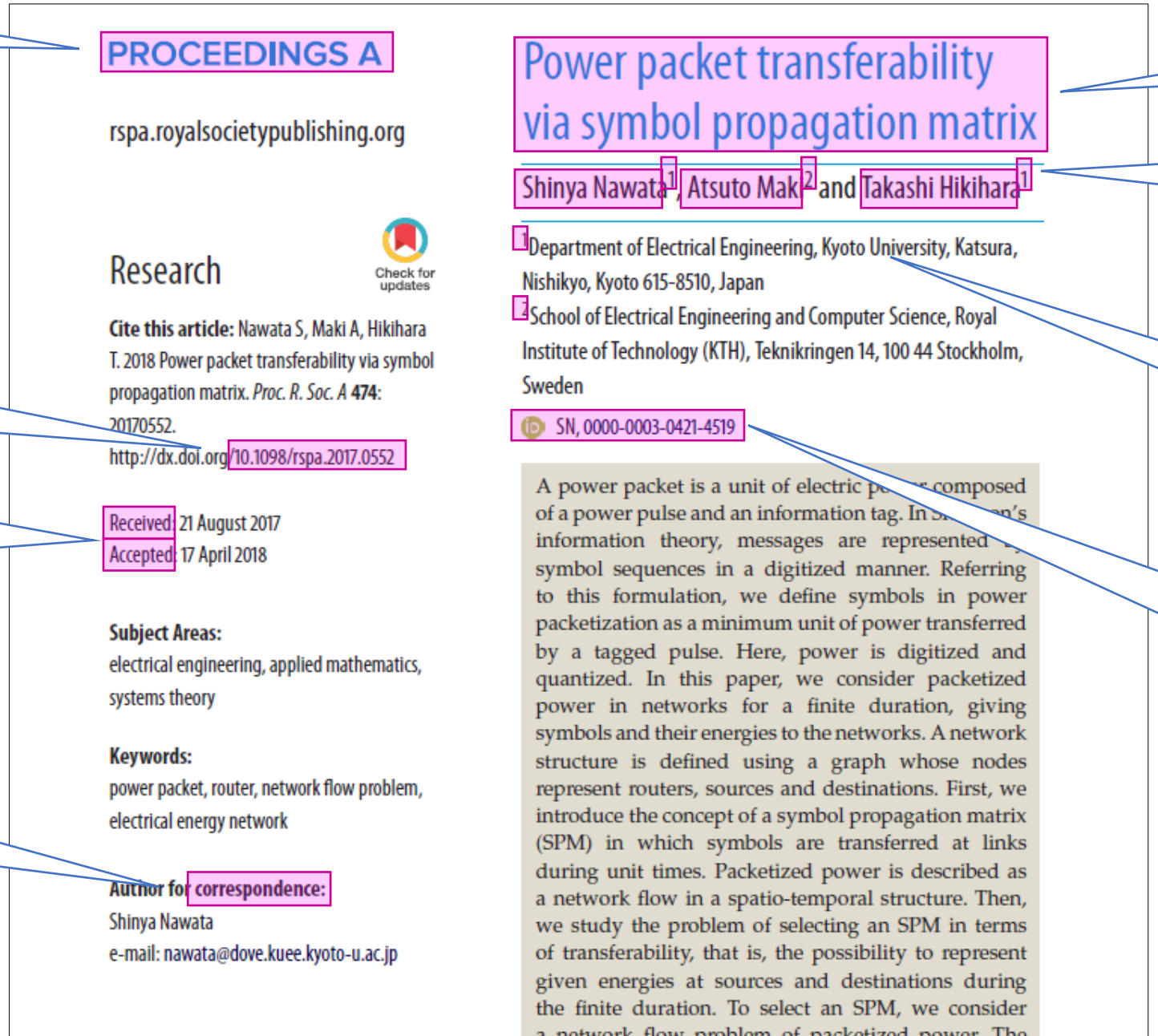
照会等の窓口となる著者



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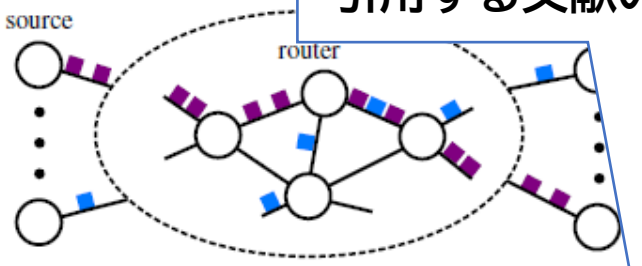
この論文の題名

この論文の著者
自然科学分野では複数名の共著であることが多い

著者の所属
この例では1に所属する著者が2名、2が1名

著者を表す記号「ORCID」
この例は筆頭著者の縄田信哉先生のもの

1. 学術コミュニケーション　②論文とはどのようなものか



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gure 1. A schematic of power packet dispatching network. (Online version in colour.)

ermodynamics [2]. Here, energy flow is handled in a continuous manner under the conservation energy. On the other hand, it is shown in Shannon's information theory [3] that 'all technical ommunications are essentially digital; more precisely, that all technical communications e equivalent to the generation, transmission and reception, of random binary digits' [4]. ommunication networks have been developed in a digitized manner by using packet switching, hich breaks messages into smaller pieces named 'packets', for dynamic assignment of network sources [5]. If we handle electric power in a digitized manner, power distribution will be anged completely different from the conventional. In this paper, we consider electrical energy etworks i

The co power ectric e nergy n ata tran eneratio ere prov ppeared om the nergy, p so propo r a control

ower levels directly to customers [21]. In the physical layer, a universal power router is designed nd evaluated for residential applications [22]. On the other hand, in most of these proposals,

power, so that power is digitized and quantized. The results of this paper suggest a mathematical framework which integrates energy and information in electrical energy networks.

Data accessibility. This work does not have any experimental data. All computational results were obtained with the cycle-cancelling algorithm [29].
Authors' contributions. The concept of SPM was conceived by S.N. and A.M. The network flow problem was formulated and numerically simulated by S.N. T.H. designed the power packet network and initiated the study. The paper was drafted by S.N. and carefully revised by all the authors. All authors gave final approval for publication.
Competing interests. We declare we have no competing interests.
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Acknowledgements. The author (S.N.) thanks the current and former members of the Robotics, Perception and Learning Laboratory of the Royal Institute of Technology (KTH) for fruitful discussions. The authors acknowledge three anonymous referees for their helpful comments on the initial draft.

References

1. Desoer CA, Kuh ES. 1969 *Basic circuit theory*, ch. 9. New York, NY: McGraw-Hill.
2. Oster G, Perelson A, Katchalsky A. 1971 Network thermodynamics. *Nature* **234**, 393–399. (doi:10.1038/234393a0)
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T, Hikihara T. 2012 Estimation of power n nsfer properties on annel. *Energies* **5**, 2141–

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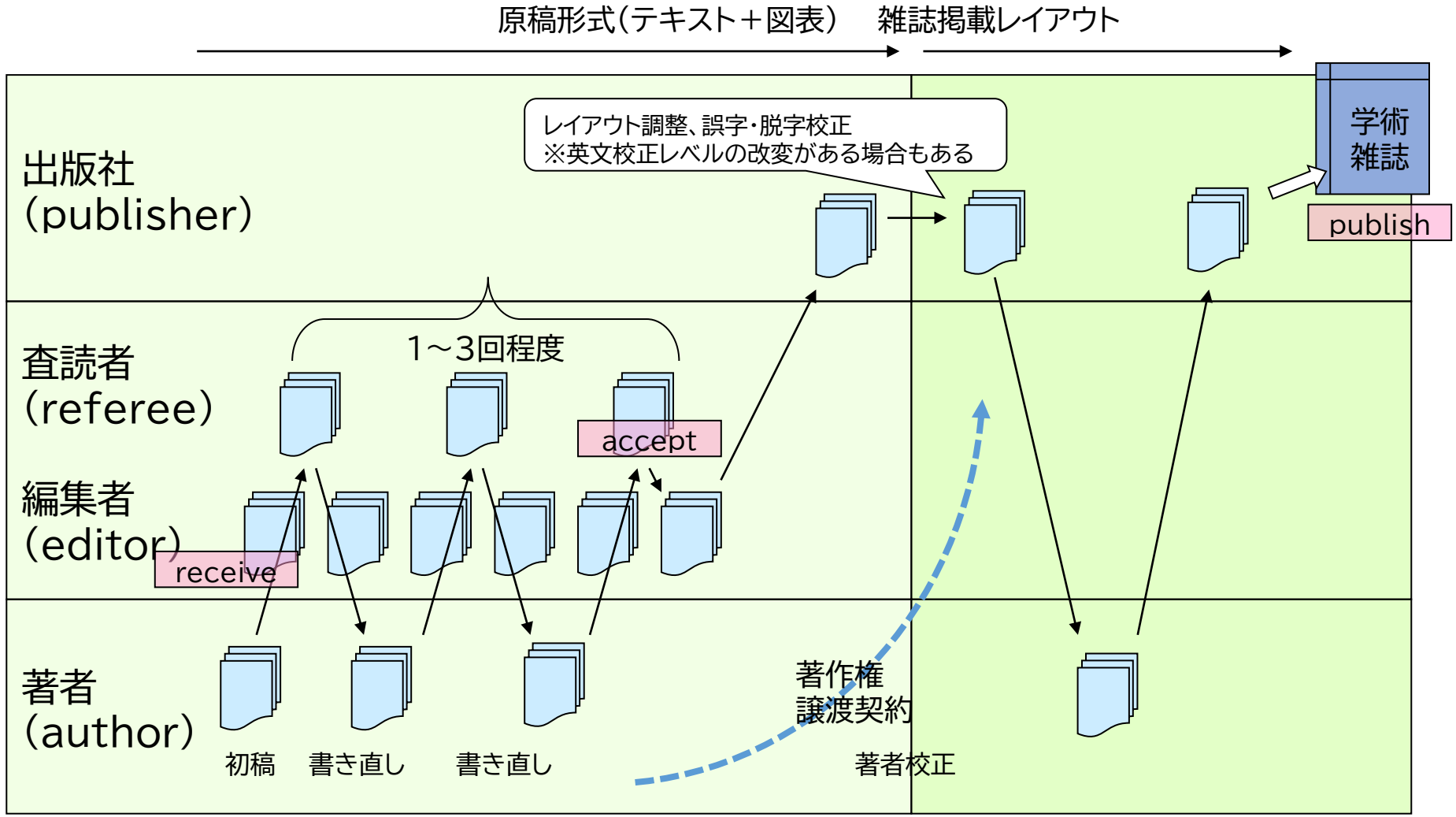
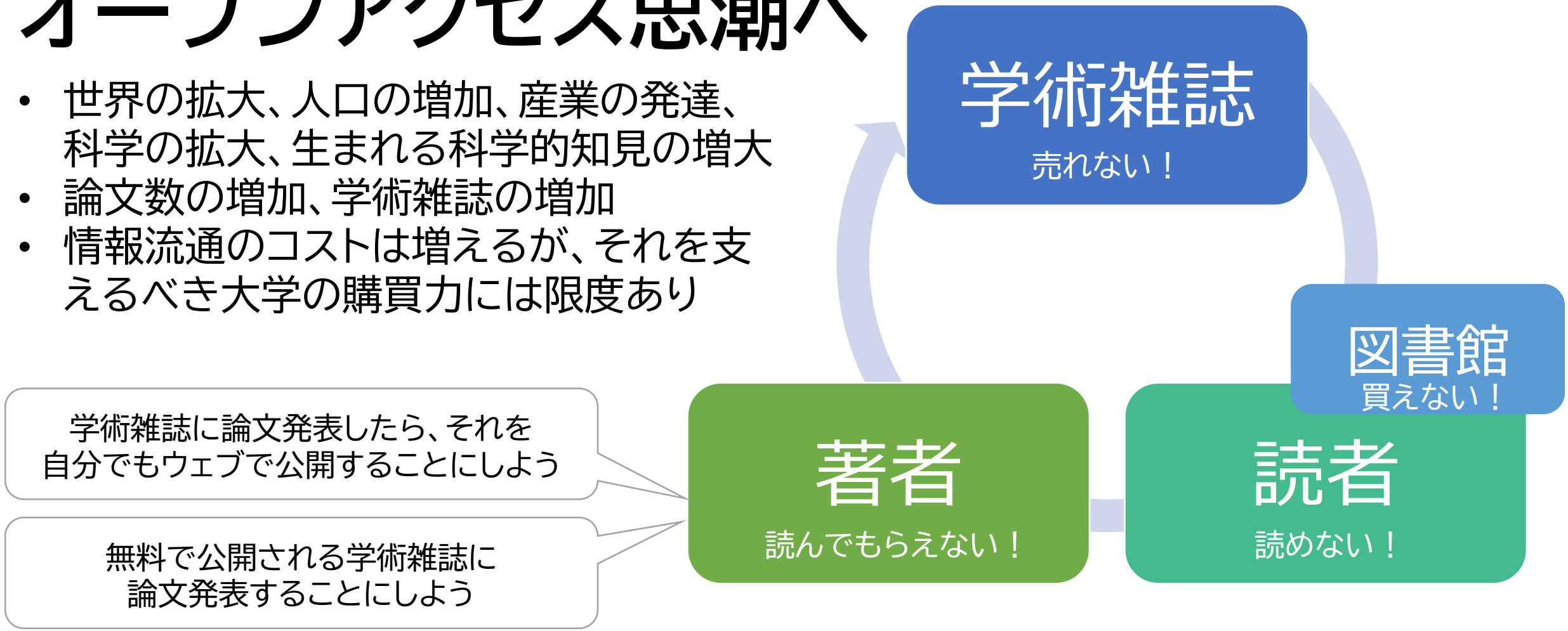


学術情報の流通不全からオープンアクセス思潮へ

- 世界の拡大、人口の増加、産業の発達、科学の拡大、生まれる科学的知見の増大
- 論文数の増加、学術雑誌の増加
- 情報流通のコストは増えるが、それを支えるべき大学の購買力には限度あり



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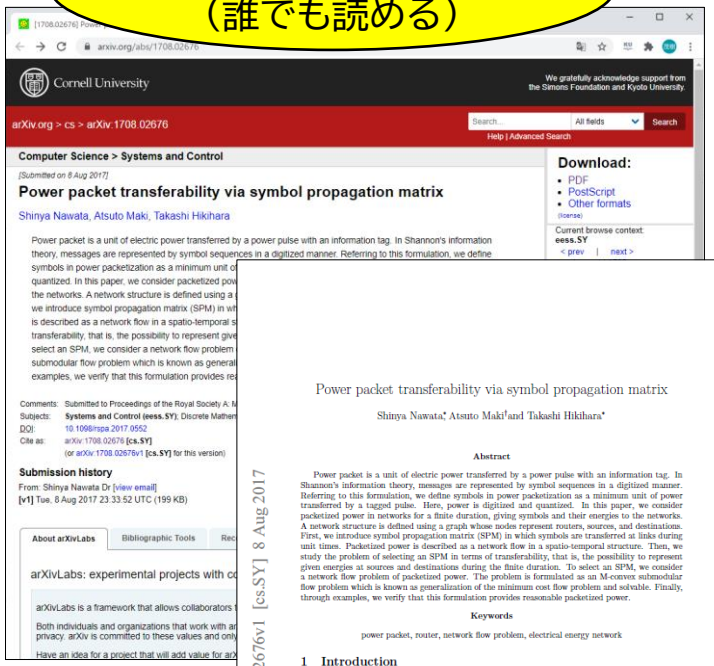

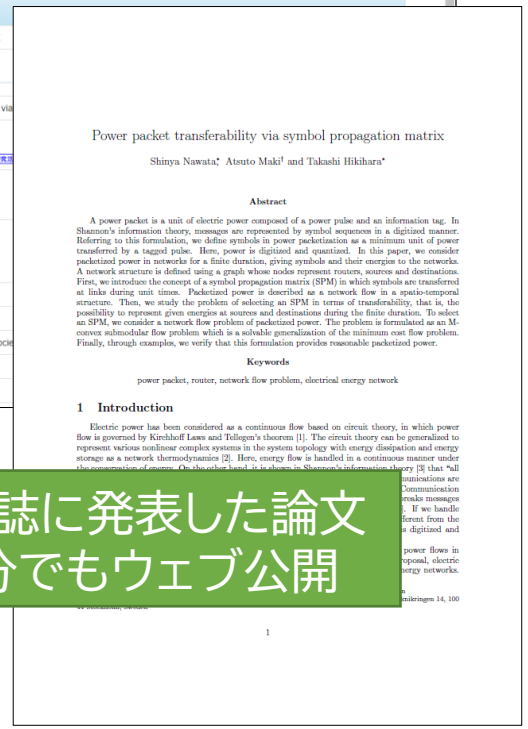

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Power packet transferability via symbol propagation matrix.

2. 機関リポジトリの基礎知識

①機関リポジトリとは

②オープンアクセスに関する政策と動向

③機関リポジトリ業務担当者の役割

＜機関リポジトリの目的＞

各機関で生成される学術研究の成果物を収集・保存・公開し、更なる文化の発展に貢献すること

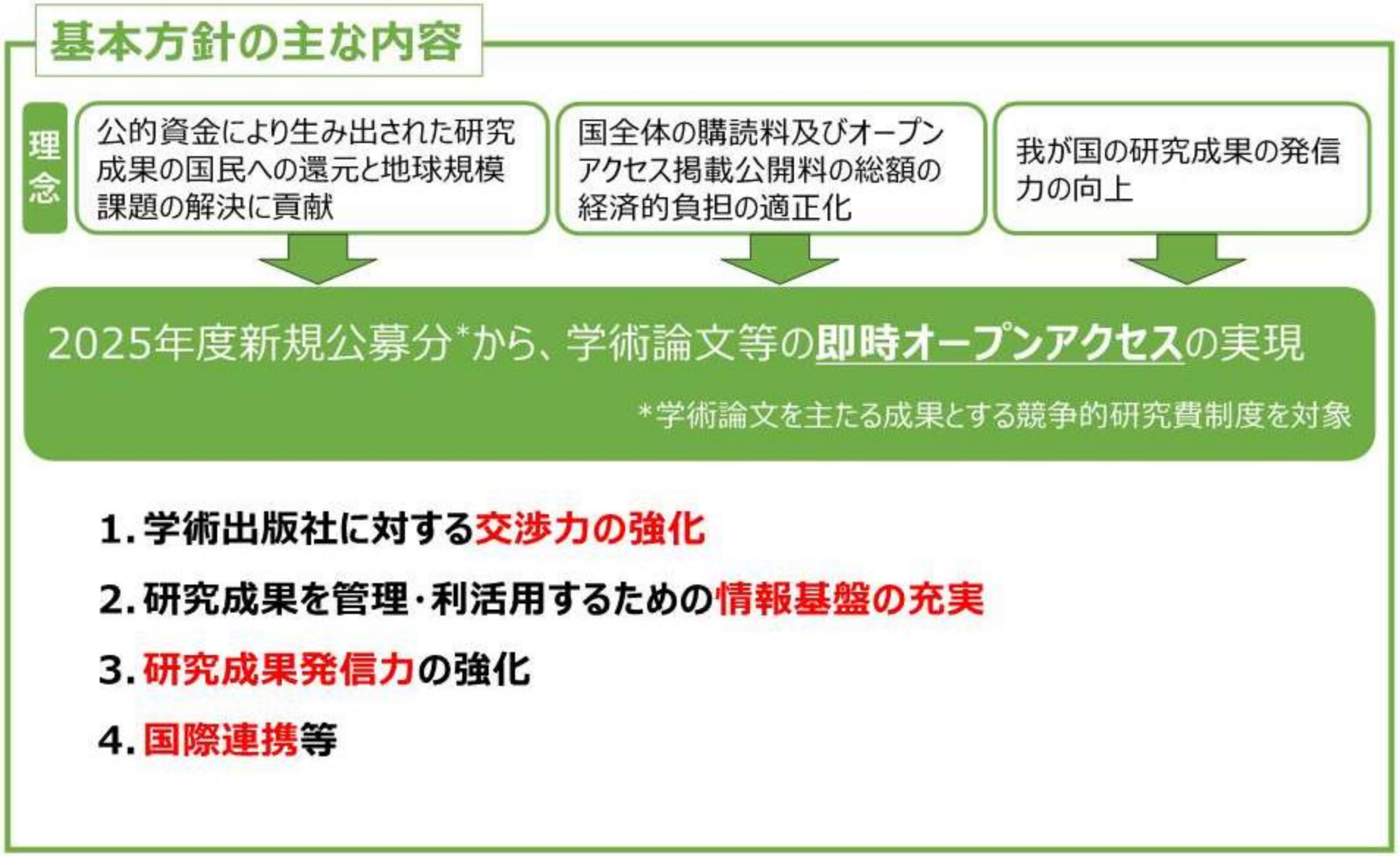
（神話）読者のための論文提供サービスである
（真実）著者のための可視性向上サービスである

（神話）著者の許諾の下に、図書館が論文を公開する
（真実）著者が自らの意志で論文を公開する。大学（図書館）はそのための場所を提供する

（神話）機関リポジトリの発展により、電子ジャーナル価格の上昇が抑制される
（真実）抑制されない。電子ジャーナル価格上昇に対する著者サイドの対抗策である

杉田 茂樹, 第11回月刊JPCOAR「オープンアクセス新任担当者向け相談会」実務事例紹介(1), 2022

- 2023.5　G7広島サミット／G7仙台科学技術大臣会合
  →オープンサイエンスにおける国際連携を盛り込んだ声明を採択
- 2023.6　統合イノベーション戦略2023
  →「新たな研究システムの構築（オープンサイエンスとデータ駆動型研究等の推進）」にて、2025年度公募分からの公的資金による学術論文の即時オープンアクセスについて明記
- 2024.2　学術論文等の即時オープンアクセスの実現に向けた基本方針
  →学術雑誌への掲載後、公的資金による学術論文、及び根拠となるデータを即時に機関リポジトリ等の情報基盤へ掲載することを義務づける
- 2024.8　「学術論文等の即時オープンアクセスの実現に向けた基本方針」の実施にあたっての具体的方策に係る説明会
  →「基本方針」の改定案を公開、即時OAできない際の対応や達成率の確認方法について記載



出典:『「学術論文等の即時オープンアクセスの実現に向けた基本方針」の実施にあたっての具体的方策について』(2024-08-29閲覧)
https://www8.cao.go.jp/cstp/hosaku_setsumei.pdf

＜機関リポジトリ業務担当者の役割＞

研究者が研究成果物を公表する際に必要な支援を行うこと

＝各機関内のオープンアクセスに関する業務全般

- 機関リポジトリシステムにデータを登録する
- オープンアクセスに関する情報を伝える
- オープンアクセス化を支援する
- オープンアクセス方針を整備する

…etc.

★業務上で得た知識や情報・人脈は、他の業務にも生かすことができる

これで本講は終わりです。