UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

BPROTOCOL FOUNDATION, et al., Plaintiffs, v. UNIVERSAL NAVIGATION INC. d/b/a UNISWAP LABS, et al., Defendants.	Case No. 1:25-cv-04214-JGK

AMICUS CURIAE BRIEF OF PARADIGM OPERATIONS LP

TABLE OF CONTENTS

Page

TABLE OF AUTHORITIES

Page(s)

Federal Cases

Other Authorities

INTERESTS OF AMICUS CURIAE

Paradigm Operations LP ("Paradigm") is a research-driven firm that invests in cutting-edge projects and protocols in the blockchain space. It provides expertise that ranges from technical (mechanism design, smart contract security, and engineering) to operational (recruiting and regulatory strategy). One area in which Paradigm focuses is the burgeoning field of decentralized finance ("DeFi"), including decentralized exchanges ("DEXs") for digital assets that enable cryptocurrency trades without any centralized intermediaries and are not controlled by any person or entity. By cutting out intermediaries, DEXs promote transparency, lower barriers to entry, and reduce risks like exchange hacks or bankruptcies. As a leading investor in DeFi and DEXs, including in Defendant Uniswap Labs, Paradigm has a significant interest in this patent case because it threatens to stifle progress across the industry. Paradigm's strong interest in the law relating to blockchains and digital assets includes ensuring that the settled limits on patent-eligible subject matter are applied in a manner that does not chill innovation.

INTRODUCTION

The patents at issue attempt to monopolize the concept of market making by using a mathematical formula to calculate currency exchange rates for performing transactions. Congress made clear in enacting 35 U.S.C. § 101 that no patentee may appropriate such an abstract idea for itself. The Supreme Court and Federal Circuit have consistently reaffirmed that principle. The patents here run headfirst into the limits of § 101 and are harmful to innovation in DeFi.

In particular, these patents claim using math to set currency exchange rates on a conventional blockchain. But as the Supreme Court has found, "fundamental economic practice[s] long prevalent in our system of commerce"—whether expressed as equations or economic concepts—are the "building blocks" of "the modern economy" and patent-ineligible. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216, 219-20 (2014). And as the Federal Circuit recently

explained, using "existing blockchain technology" to "implement [an] abstract idea" does not confer patent-eligibility. *Rady v. Boston Consulting Grp., Inc.*, 2024 WL 1298742, at *5 (Fed. Cir. Mar. 27, 2024). Permitting enforcement of these patents would contravene settled doctrine and hinder growth in an important industry. Indeed, open-source implementations of the Uniswap Protocol ("Uniswap") and other DEXs are a vital part of their evolution—enabling anyone to use, contribute to, and strengthen the broader DEX ecosystem.

HISTORICAL AND TECHNICAL BACKGROUND

I. EXCHANGES FACILITATE ASSET TRADING, A FUNDAMENTAL ECONOMIC ACTIVITY

DEXs are an outgrowth of the long tradition of exchanges that facilitate transactions between buyers and sellers. Currency exchanges have operated since ancient times.[1] The first prototypical securities exchange opened in Amsterdam in 1602.[2] Securities exchanges for trading assets have been a pillar of the U.S. economy since the 1792 Buttonwood Agreement originating the New York Stock Exchange.[3] Indeed, the Supreme Court has noted that exchanges have long

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1 *See, e.g.*, *Matthew* 21:12-13 (describing money-changers in the temple).

2 Stanislav Dolgopolov, *Regulating Merchants of Liquidity: Market Making from Crowded Floors to High-Frequency Trading*, 18 U. Pa. J. Bus. L. 651, 652 n.4 (2016) (citing Lodewijk Petram, *The World's First Stock Exchange: How the Amsterdam Market for Dutch East India Company Shares Became a Modern Securities Market, 1602-1700*, at 38-40, 181 (2011)).

3 *See Alpine Sec. Corp. v. Fin. Indus. Regul. Auth.*, 121 F.4th 1314, 1319 (D.C. Cir. 2024) (citing Stuart Banner, *The Origin of the New York Stock Exchange, 1791-1860*, 27 J. Legal Stud. 113, 114-115 (1998)); *see also Gordon v. NYSE*, 422 U.S. 659, 663 (1975).

"perform[ed] an important function in the economic life of this country."[4] The 18th- and 19th-century assemblies of merchants and boards of trade gave way to bustling trading floors by the 20th century.[5] For decades now, exchanges of all types, including currencies, commodities and securities, have been largely automated and electronic.[6] Order submission, matching, trade execution, and settlement are now all done electronically—and they all have clear antecedents from the time when transactions were executed in person on a trading floor.

Exchanges reduce trading frictions and search costs, facilitate transactions, and build confidence in the integrity of the market.[7] Well-performing exchanges create network effects that enhance liquidity and lead to efficient, informative prices.[8] One key aspect of efficient exchanges

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4 *Silver v. NYSE*, 373 U.S. 341, 349 (1963).

5 *See* Dolgopolov, *Regulating Merchants*.

6 *See, e.g.*, U.S. SEC. & EXCH. COMM'N, *Staff Report on Algorithmic Trading in U.S. Capital Markets* (2020), https://www.sec.gov/files/algo_trading_report_2020.pdf; U.S. SEC. & EXCH. COMM'N, *The Impact of Recent Technological Advances on the Securities Markets* (1997), https://www.sec.gov/news/studies/techrp97.htm.

7 *See, e.g.*, Paul G. Mahoney, *The Exchange As Regulator*, 83 Va. L. Rev. 1453, 1459-1460 (1997).

8 *See, e.g.*, Ananth Madhavan, *Market Microstructure: A Survey*, 3 J. Fin. Mark. 205, 226-27 (2000).

is the participation of market makers. A market maker functions like a bridge between buyers and sellers, continuously standing ready to buy or sell so that transactions can occur efficiently.[9]

II. DIGITAL ASSET EXCHANGES, LIKE THEIR TRADITIONAL COUNTERPARTS, FACILITATE ASSET TRADING

The rise of cryptocurrencies has led to the emergence of digital asset exchanges, including DEXs like Uniswap. Digital asset exchanges share many key features with traditional exchanges. They "enable smoother and faster trading between investors, just as stock and commodities exchanges emerged to enable easy trading of securities."[10] Like traditional exchanges, digital asset exchanges also allow users to buy and sell assets at matched prices, rely on network effects to drive liquidity and efficient pricing, and provide for the nearly instantaneous completion of transactions.[11] And also like traditional exchanges, digital asset exchanges operate according to a core set of rules, whether codified by user agreement (*e.g.*, NYSE or Coinbase) or smart contract (*e.g.*, Uniswap).[12]

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[9] U.S. SEC. & EXCH. COMM'N, *Introduction to Investing: Market Makers*, https://www.investor.gov/introduction-investing/investing-basics/glossary/market-makers.

[10] *Underwood v. Coinbase Global, Inc.*, 654 F. Supp. 3d 224, 230 (S.D.N.Y. 2023) (Engelmayer, J.) (reversed in part on other grounds by *Oberlander v. Coinbase Global, Inc.*, 2024 WL 1478773 (2d Cir. 2024)).

[11] *See, e.g.*, President's Working Group on Digital Asset Markets, *Strengthening American Leadership in Digital Financial Technology* (Jan. 23, 2025).

[12] *See Coinbase, Inc. v. Bielski*, 599 U.S. 736, 738 (2023) (describing the Coinbase user agreement); *Risley v. Universal Navigation Inc.*, 2025 WL 615185, at *2 (2d Cir. 2025) (describing

There are two primary types of digital asset exchanges: "centralized" and "decentralized."[13] Centralized exchanges ("CEXs") mimic their traditional forebears—a centralized intermediary sets rules, runs the order book, and matches trades electronically.[14] By contrast, decentralized exchanges ("DEXs") let users enter trades without a central intermediary.[15] DEXs are critical to the rapidly evolving DeFi ecosystem, which has the potential to increase financial inclusion, reduce reliance on intermediaries, and lower transaction costs. Indeed, Paradigm recently conducted a survey of employees of major financial institutions. It revealed that most traditional financial firms are analyzing or experimenting with DeFi, and most believe that DeFi will soon be of critical importance to their core products and business lines.[16]

In a typical DEX, there is no middleman setting prices or matching trades. Instead, the price of any transaction is determined by *automated* market making, which entails using math to

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the role of smart contracts in the Uniswap Protocol); NYSE Master User Agreement (Mar. 2025), https://www.nyse.com/publicdocs/nyse/markets/nyse/NYSE_Master_User_Agreement.pdf.

[13] *Underwood*, 654 F. Supp. 3d at 230.

[14] *Risley v. Universal Navigation Inc.*, 690 F. Supp. 3d 195, 202, 205 (S.D.N.Y. 2023).

[15] *Id.* at 207-08, 220; *Underwood*, 654 F. Supp. 3d at 230; Dkt. 47 ¶ 21.

[16] Paradigm Policy Team, *TradFi Tomorrow: DeFi and the Rise of Extensible Finance* (2025), https://cdn.sanity.io/files/dgybcd83/production/90847c751e91613c908b8b9d492012509d66a1bd.pdf.

set the price of the assets being exchanged without any intermediary.[17] The technological tools that power DEXs were also well known and widely used long before the patents here:

- A **blockchain** is a "decentralized public ledger spread across a network of many computers."[18] It keeps an immutable record of transactions. As the Federal Circuit has observed, a blockchain, without more, is conventional technology. *Rady*, 2024 WL 1298742, at *4; *see also id.* at *2 ("[A] blockchain is merely a ledger maintained and verified through a peer-to-peer network . . . .") (quoting District Court). The patents here even acknowledge that "well-known" applications of blockchain were already in existence, including "the public ledger of transactions for cryptocurrencies such as used in bitcoin," which was created in 2008.[19]

[17] Uniswap Whitepaper v.1, https://docs.uniswap.org/contracts/v1/guides/trade-tokens ("Pricing is automatic, based on the x * y = k market making formula which automatically adjusts prices based off the relative sizes of the two reserves and the size of the incoming trade.").

[18] *Coinbase, Inc. v. SEC*, 126 F.4th 175, 182 (3d Cir. 2025).

[19] U.S Patent No. 11,107,049 (the "'049 patent") at 22:65-67; *see* Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (Aug. 21, 2008); *SEC v. Ripple Labs, Inc.*, 682 F. Supp. 3d 308, 316-17 (S.D.N.Y. 2023) (describing that the XRP Ledger was publicly launched and operational in 2012).

- A **token** or **coin** is a digital unit of value recorded on a blockchain.[20] Tokens are a fundamental part of any blockchain and have been in use since at least 2008.[21]
- **Smart contracts** are "self-executing, self-enforcing programs that write the terms of the agreement between the buyer and seller of tokens directly into the program's code . . . [W]hen a given event occurs, the trade auto-executes, without the need for third-party intervention."[22] Smart contracts were first theorized in the 1990s and have been operational on the Ethereum blockchain since at least 2015.[23]

ARGUMENT

I. THE ASSERTED PATENTS FLOUT CONGRESS' AND THE SUPREME COURT'S PROHIBITION ON MONOPOLIZING ABSTRACT IDEAS LIKE MAKING MARKETS FOR CURRENCY USING A MATHEMATICAL CALCULATION

It is a bedrock principle that laws of nature, natural phenomena, and abstract ideas are not patent-eligible under 35 U.S.C. § 101. The Supreme Court has long held that "[a]n idea of itself

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[20] President's Working Group on Digital Asset Markets, *Strengthening American Leadership in Digital Financial Technology*, at 11 n.23 (Jan. 23, 2025).

[21] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (Aug. 21, 2008); *see also SEC v. Ripple Labs, Inc.*, 682 F. Supp. 3d 308, 316 (S.D.N.Y. 2023) (describing that the XRP Ledger's source code generated the token XRP in 2012).

[22] *Risley v. Universal Navigation, Inc.*, 690 F. Supp. 3d 195, 202 (S.D.N.Y. 2023)

[23] *See id.*; Vitalik Buterin, *Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform* (2014), https://ethereum.org/content/whitepaper/whitepaper-pdf/Ethereum_Whitepaper_-_Buterin_2014.pdf; Nick Szabo, *Smart Contracts: Building Blocks for Digital Markets*, 16 EXTROPY (1996).

is not patentable." *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498, 507 (1874). The reasoning is straightforward: abstract ideas are "the basic tools of scientific and technological work." *Gottschalk v. Benson*, 409 U.S. 63, 67-68 (1972). Exclusive rights in those building blocks would "foreclose[] more future invention than the underlying discovery could reasonably justify." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 86 (2012). "[M]onopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it." *Id.* at 71.

Courts have consistently applied this principle to invalidate patents that seek to monopolize economic building blocks. In *Bilski*, the Supreme Court held that patent claims describing, in a series of steps, "the basic concept of hedging, or protecting against risk," were ineligible: "[h]edging is a fundamental economic practice" and therefore "an unpatentable abstract idea." *Bilski v. Kappos*, 561 U.S. 593, 611 (2010). Building on that foundation, the Supreme Court concluded in *Alice* that, "[l]ike the risk hedging in *Bilski*, the concept of intermediated settlement is 'a fundamental economic practice long prevalent in our system of commerce.'" 573 U.S. at 219 (citation omitted). Thus, "intermediated settlement, like hedging, is an 'abstract idea' beyond the scope of § 101." *Id.* at 220 (citation omitted). Calculating exchange rates to facilitate transactions is similarly a "fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class." *Bilski*, 561 U.S. at 611.

The patent claims here simply dress up that basic economic practice by applying a mathematical equation for transactions on a blockchain. But the Federal Circuit has made clear that "rel[iance] on the conventional use of existing blockchain technology" does not rescue a patent-ineligible abstract idea." *Rady*, 2024 WL 1298742, at *4. The purported blockchain technology in the patents here fall squarely under *Bilski*. And thus the claims are patent-ineligible.

Specifically, these patents "relate[] to the field of exchange and evaluation of virtual currency." '049 patent at 1:18-21. They purport to address "shortcomings regarding the ability to determine the value of [] Tokens" being transferred on a conventional blockchain by determining that value "without reliance on a transaction between two willing parties." *Id.* at 2:13-15, 6:22-25, 6:32-35. To that end, the claims—which define the scope of the alleged invention—are directed to a mathematical formula used for the economic concept of market making to set the price of a cryptocurrency token on an exchange. '049 patent at 9:25-52, cl. 1; U.S. Patent No. 11,574,291 at cls. 1, 11, 12. The "formula for determining said price" is simply expressed as a math equation ('049 patent at 9:33-39): [24]

$$Tp = \frac{Tr}{Tt * Rr}$$

And while "[i]nnumerable are the lawyers who explain that they picked law over a technical field because they have a 'math block,'" *Jackson v. Pollion*, 733 F.3d 786, 788 (7th Cir. 2013) (Posner, J.), math alone does not make an invention patent-eligible. A fundamental economic practice like calculating exchange rates using math is the very definition of an abstract idea. And under settled law, it may not be patented. Indeed, the Federal Circuit has already held claims directed to "offer-based price optimization" abstract and invalid. *OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1362 (Fed. Cir. 2015) (finding invalid claims that "broadly recite[d] a 'method of pricing a product for sale,' and the specification describe[d] the invention

[24] T_p is a price of a first token, T_r is the total volume of a second token held in a reserve, T_t is the total volume of the first token in circulation, and R_r is a "Reserve Ratio Constant." '049 patent at 9:25-44.

as an 'automatic pricing method and apparatus for use in electronic commerce.'") (citations omitted). The claims here are directed to using an automatic pricing equation to optimize exchange rates; they are similarly invalid.

That follows from the more general principle that "mathematical algorithms for performing calculations" are unpatentable abstract ideas. *In re Bd. of Trs. of Leland Stanford Junior Univ.*, 991 F.3d 1245, 1250 (Fed. Cir. 2021). "[P]atent law does not protect" even a supposed "advance in mathematical techniques in finance . . ., without more, no matter how groundbreaking the advance." *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1170 (Fed. Cir. 2018). That is why no one holds a patent on, for example, the Black–Scholes equation to price options; that knowledge belongs to humanity. Likewise, using a particular mathematical formula for performing pricing calculations on a blockchain is not patent-eligible.

Beyond the abstract idea, the claims here add only conventional, off-the-shelf components: smart contracts to set the rules and a secure ledger to record them. As noted above, the Federal Circuit has already held that "reli[ance] on the conventional use of existing blockchain technology" does not rescue a patent-ineligible abstract idea. *Rady*, 2024 WL 1298742, at *4; *id.* at *3 ("[C]laims are not saved from abstraction merely because they recite components more specific than a generic computer."). Here, the patents acknowledge that smart contracts and secure ledgers were conventional at the time of filing. '049 patent at 2:9-12 ("[A]fter Ethereum, several other virtual currency networks implementing smart contracts were established."), 22:65-67 ("One well-known application of a block chain is the public ledger of transactions for cryptocurrencies such as used in bitcoin."); *see also id.* at 1:45-51. Moreover, the Examiner who reviewed these patents stated that "[v]alidating a smart contract and then adding it to a blockchain ledger" and "[e]xecuting smart contracts and generating an assurance proof of the execution" were

"conventional at the time of invention." '049 Notice of Allowance at 6, July 21, 2021 (Ex. 1). Courts, too, have recognized that smart contracts and blockchains were known well before these patents. *Coinbase, Inc. v. SEC*, 126 F.4th 175, 208 (3d Cir. 2025) (Bibas, J., concurring) (referring to smart contracts on the Ethereum blockchain in 2014).

At bottom, these patent claims amount to no more than calculating token exchange rates by formula and recording the results on an ordinary blockchain. That is an abstract economic idea executed on conventional technology. It is akin to trying to smuggle an improper patent lawsuit into the courts by shouting "Blockchain!"

II. IF UPHELD, PLAINTIFFS' PATENTS WOULD HINDER INNOVATION IN THE BURGEONING DEFI INDUSTRY

Defendant Uniswap Labs is a DeFi innovator that developed one of the most popular DEXs in the market.[25] Patent law is supposed to encourage invention, not allow someone to lock up for personal profit the basic concepts for calculating currency exchange rates.

The DeFi industry is at an inflection point for technological development. As Paradigm's recent survey indicated, over two-thirds of participants are currently considering implementing DeFi technology to drive down costs and increase returns.[26] 86% of survey participants ranging from asset managers to retail banks to payments companies indicated that they are already using

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[25] *See* CoinGecko, *Top Decentralized Exchanges Ranked by 24H Trading Volume*, https://www.coingecko.com/en/exchanges/decentralized.

[26] Paradigm Policy Team, *TradFi Tomorrow: DeFi and the Rise of Extensible Finance* (2025), https://cdn.sanity.io/files/dgybcd83/production/90847c751e91613c908b8b9d492012509d66a1bd.pdf.

blockchain technology.[27] And most of the survey participants also expressed an interest in DeFi, with the greatest perceived benefits coming from "faster settlement times, increased transparency, and lower transaction costs."[28]

For years, lack of regulatory certainty was the main reason that traditional financial institutions hesitated to engage with DeFi.[29] But the regulatory tide has turned. As Securities and Exchange Commission ("SEC") Chairman Paul Atkins noted earlier this year, "the American values of economic liberty, private property rights, and innovation are in the DNA of the DeFi, or Decentralized Finance, movement."[30] He praised DEXs as having been "proven to be resilient in the face of crises," and said that the SEC should not "allow century-old regulatory frameworks to stifle innovation with technologies that could upend and most importantly improve and advance our current, traditional intermediated model."[31] When the Chairman of the SEC praises DeFi's resilience and promise, it becomes clear this is not a backwater experiment—it is the future of finance. Patent law should be clearing the path forward, not throwing up roadblocks for a private company's financial gain.

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27 *Id.* at 16.

28 *Id.* at 18-19.

29 *Id.* at 42-43.

30 Paul S. Atkins, *Remarks at the Crypto Task Force Roundtable on Decentralized Finance* (June 9, 2025), https://www.sec.gov/newsroom/speeches-statements/atkins-remarks-defi-roundtable-060925.

31 *Id.*

Moreover, DEXs typically run on open-source smart contracts that anyone can review, use, and build upon.[32] This framework lets participants trade tokens, create markets, and provide liquidity, reflecting principles of transparency and broad access. The patents here move in the opposite direction. They improperly seek to turn basic mathematical relationships into private property that should instead remain "part of the storehouse of knowledge of all men . . . free to all men and reserved exclusively to none." *Bilski*, 561 U.S. at 602. Endorsing the idea that patents can cover pure concepts of code that merely apply math would not only be an incorrect reading of precedent, it would also fatally damage an important burst of innovation, like a May frost over a blossoming field. This Court should not permit going down that dangerous course.

CONCLUSION

The patents here try to privatize basic and conventional building blocks of DeFi. At bottom, they claim nothing more than using a formula to calculate exchange rates, an age-old economic idea, now dressed up in crypto jargon and executed with off-the-shelf tools like smart contracts and blockchains. Section 101 flatly prohibits these types of patent claims. Paradigm

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[32] *See, e.g.*, Uniswap, *How Uniswap Works*, https://docs.uniswap.org/contracts/v2/concepts/protocol-overview/how-uniswap-works ("Uniswap is open-source software licensed under the GPL."). Several of the other most popular DEXs, including SushiSwap and PancakeSwap, are built on Uniswap's open-source software. *See* Github, Pancake Contracts, https://github.com/pancakeswap/pancake-smart-contracts; Gemini, *SushiSwap (SUSHI): A Community-Centric Evolution of Uniswap*, https://www.gemini.com/cryptopedia/sushiswap-sushi-coin-sushibar-chef-nomi ("Because pseudonymous developer Chef Nomi started [SushiSwap] as a direct clone of Uniswap, SushiSwap and Uniswap share a nearly identical source code.").

respectfully submits that the Court should dismiss the case outright and let the future of global finance proceed without rent-seeking roadblocks to open innovation.

Dated: September 4, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on September 4, 2025, I electronically filed the foregoing with this Court's CM/ECF system, which will send a notice of filing to all registered users.

/s/ *Gregory Sobolski*
Gregory Sobolski

CERTIFICATE OF COMPLIANCE

I hereby certify that the foregoing brief contains 3,342 words (not including the cover page, table of contents, table of authorities, certificate of service, or this certificate of compliance), calculated using the word count feature in Microsoft Word, and that the brief complies with the formatting rules contained in the Court's Individual Practices.

/s/ Gregory Sobolski
Gregory Sobolski