

M C P S E R V E R

N O C O D E

C L O U D H O S T E D

Backside Spin Mechanics Analyzer MCP

Calculate the physics of your freestyle snowboard rotations.

Backside Spin Mechanics Analyzer uses physics-based modeling to help you understand the mechanics of backside rotations. It calculates takeoff momentum, predicts how different grabs affect your spin axis, and evaluates landing stability to help you prepare for high-consequence maneuvers.

A+ Quality Score 100/100

snowboarding

physics

rotation

freestyle

mechanics



The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

Your AI Connections Run Through Vinkius Cloud

The world's largest
managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.

— Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256

Encryption at rest

Ed25519

PKI vault signatures

24h TTL

Ephemeral session keys

V8 Isolate

Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT`https://edge.vinkius.com/{token}/mcp`

Claude



Cursor



VS Code



Windsurf



Grok



Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

06 — Honeypot Trap System

Phantom credentials are injected into isolated environments. If a honeypot is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1)
Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

Get started at cloud.vinkius.com — connect your AI agent in under 60 seconds.

Backside Spin Mechanics Analyzer MCP

4 tools available

Cloud-hosted on Vinkius

You can use this MCP to run physics simulations on your freestyle snowboard tricks. Instead of guessing if you have enough speed or if a specific grab will throw off your axis, you can feed your approach data into your AI client to get hard numbers. The engine looks at your approach speed, the angle of your takeoff edge, and your body rotation to determine exactly how you will behave in the air.

If you are working on a new backside rotation, you can model the entire flight path. You can check how much edge pressure you need to generate the right momentum or how an Indy grab versus a Melon grab changes your rotation speed. It even helps you assess the risk of blind landings by calculating stability ratings. It is a technical tool for anyone who wants to move from intuition to calculated execution in their freestyle riding.

Core Capabilities

01 — Takeoff Force Calculation

Your agent uses this to find the necessary edge pressure and momentum for a specific approach.

02 — Spin Axis Prediction

The AI calculates how different grab styles shift your center of mass and rotation axis.

03 — Landing Risk Assessment

Your client evaluates stability ratings to predict if a landing will be smooth or unstable.

04 — Full Flight Simulation

The MCP runs a complete sequence from the initial edge engagement to the final landing impact.

One Click on Vinkius — From Prompt to Execution

Available at vinkius.com/en/ai-agent-connect/backside-spin-mechanics-analyzer — connect your AI agent in three steps.

- 01 Connect your MCP-compatible client to the Vinkius hosted environment.
- 02 Provide your approach data like speed, edge angle, and rotation units to your agent.
- 03 The agent calls the specific physics tools within the MCP.
- 04 Receive calculated values for momentum, axis, and landing stability.

Connect your AI client to Vinkius to start running physics simulations immediately.

Built For

This MCP is built for freestyle snowboarders and coaches who want to apply physics to their trick progression.

Freestyle Snowboarders

Riders who use the data to plan specific rotations and grab adjustments.

Snowboard Coaches

Instructors who use the simulations to explain takeoff mechanics to their athletes.

Physics Enthusiasts

Users who want to model rotational dynamics in a snowboarding context.

What Changes When You Connect

- 01 Reduces guesswork by providing specific Newton and rad/s values for rotations.
- 02 Identifies landing risks before you attempt a high-consequence maneuver.

- 03 Shows how different grab types physically alter your flight path.
- 04 Provides a mathematical basis for improving takeoff edge pressure.

Real-World Applications

Optimizing Takeoffs

Calculate the exact edge angle and speed needed to clear a specific jump height.

Safety Checks

Run a simulation to see if your rotation speed makes a blind landing too unstable.

Grab Selection

Compare how an Indy grab versus a Melon grab changes your rotation speed.

Trick Progression

Model a full maneuver to understand the relationship between momentum and rotation.

Patterns to Avoid

Guessing rotation speed

⚠ AVOID

You assume an Indy grab will naturally slow your spin down without checking the math first.

✓ INSTEAD

Use ``calculate_rotation_profile`` to see exactly how that specific grab shifts your center of mass and rotation speed.

Ignoring landing stability

⚠ AVOID

You plan a high-speed rotation and assume you can just muscle the landing if it feels shaky.

✓ INSTEAD

Run ``evaluate_landing_safety`` to get a stability rating before you ever leave the jump.

Fragmented trick analysis

❌ AVOID

You only look at your takeoff speed and ignore how the flight path develops mid-air.

✓ INSTEAD

Use `simulate\_full\_maneuver` to get a complete view of the entire sequence from edge engagement to impact.

The Right Fit

Connect this MCP if you want to replace intuition with Newton and rad/s values for trick progression. Do not use this if you are just riding for fun and don't care about the physics of your rotation. The decision depends on whether you need mathematical certainty for high-consequence maneuvers.

Backside Spin Mechanics Analyzer: 4 Physics Tools

These tools translate approach speed and edge pressure into precise rotational data and landing stability ratings.

#	TOOL	DESCRIPTION
01	analyze_takeoff_dynamics	This tool calculates the initial forces and rotational impulses generated during your takeoff.
02	calculate_rotation_profile	Use this to determine your predicted spin axis and rotation speed based on specific grab types.
03	evaluate_landing_safety	This tool assesses the stability and risk level of your landing.
04	simulate_full_maneuver	This provides a complete overview of the entire backside spin attempt from takeoff to landing.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

U Analyze a takeoff with 8 m/s speed, 15 degree edge angle, and 50 units of body rotation.



The required edge pressure is 45.2 N, providing an initial angular momentum of 120.5 and a linear takeoff trajectory.

U How will an Indy grab affect my rotation if my momentum is 100?



With an Indy grab, your rotation axis will be diagonal, your rotation speed will be 12.5 rad/s, and your stability rating is 8.5.

U Will I land safely with a rotation speed of 15 and a Melon grab during a blind landing?



Your landing stability is 4.2, which is considered Moderate risk. It is recommended to open your chest earlier to spot the landing.

Frequently Asked Questions

01 What kind of data do I need for a takeoff analysis?

You should provide your approach speed, the angle of your takeoff edge, and your body rotation units.

02 Can this MCP predict how a grab changes my spin?

Yes, the rotation profile tool calculates how different grabs affect your spin axis and rotation speed.

03 How does it determine landing safety?

The tool assesses stability ratings based on your rotation speed and the type of grab used during the flight.

04 Which AI clients can I use with this MCP?

You can use any MCP-compatible client like Claude, Cursor, or Windsurf.

05 Do I need to host this myself?

No, Vinkius hosts the MCP and manages everything so you can use it with one click.

06 How does the grab type affect my rotation?

The grab type changes your moment of inertia. Using ``calculate_rotation_profile`` will show how different grabs like Indy or Melon affect your rotation speed and axis.

07 Can I simulate a whole jump at once?

Yes, you can use the ``simulate_full_maneuver`` tool to get a complete breakdown of takeoff, rotation, and landing in one go.

08 What determines my landing stability?

Landing stability is determined by your rotation speed and the difficulty of the blind landing. You can check this using ``evaluate_landing_safety``.

Go Live in 60 Seconds

Get your connection token from cloud.vinkius.com, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

`https://edge.vinkius.com/[TOKEN]/mcp`

CLIENT	WHERE TO CONFIGURE
 Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
 Cursor	Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint
 VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add <code>"backside-spin-mechanics-analyzer": { "url": "..." }</code>
 Windsurf	MCP Settings → <code>mcp_settings.json</code> → Add endpoint URL
 ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
 Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

-  Ask ChatGPT 
-  Ask Claude 
-  Ask Perplexity 
-  Ask Gemini 
-  Ask Grok 

READY TO CONNECT

Backside Spin Mechanics Analyzer is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and
start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

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DOCUMENT INFORMATION

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Platform	Vinkius Cloud for AI Agents
Endpoint	https://edge.vinkius.com/{token}/mcp

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