SavchenkoSolutions Physics Benchmark — Schemas & Submission

Version **v0.1**   —   Updated: **October 12, 2025**

Maintainer: **Aliaksandr (Alex) Melnichenka**

aliaksandr@melnichenka.com   —   melnichenka.com

Overview

This document specifies JSON schemas for *problems* and *predictions*, along with submission endpoints and scoring notes.

Problem Item Schema (JSON Schema Draft-07)

Filename: `problem.schema.json`

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "title": "SS Problem Item",
  "type": "object",
  "required": ["problem_id", "language", "topic", "type", "statement"],
  "properties": {
    "problem_id": { "type": "string", "pattern": "SS-(EN|RU)-[0-9]{5}"
        },
    "language": { "type": "string", "enum": ["EN", "RU"] },
    "topic": {
      "type": "string",
      "enum": ["algebra","mechanics","thermodynamics","em","optics","
          modern"]
    },
    "difficulty": { "type": "integer", "minimum": 1, "maximum": 5 },
    "type": { "type": "string", "enum": ["numeric","symbolic","proof"]
        },
    "statement": { "type": "string" },
    "hints": { "type": "array", "items": { "type": "string" } },
    "solution_outline": { "type": "array", "items": { "type": "string"
        } },
    "final_answer": { "type": "string" },
    "units": { "type": "string" },
    "prerequisites": { "type": "array", "items": { "type": "string" } }
        ,
    "tags": { "type": "array", "items": { "type": "string" } },
    "metadata": { "type": "object" }
  },
  "additionalProperties": false
}
```

Predictions Schema (Submission Payload)

Filename: `predictions.schema.json`

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "title": "SS Predictions Payload",
  "type": "object",
  "required": ["run_id", "predictions"],
```

```json
  "properties": {
    "run_id": { "type": "string", "minLength": 1 },
    "predictions": {
      "type": "array",
      "items": {
        "type": "object",
        "required": ["problem_id","answer"],
        "properties": {
          "problem_id": { "type": "string", "pattern": "SS-(EN|RU)
            -[0-9]{5}" },
          "answer": { "type": "string" },
          "reasoning": { "type": "string" },
          "units": { "type": "string" },
          "latency_ms": { "type": "number", "minimum": 0 }
        },
        "additionalProperties": false
      }
    }
  },
  "additionalProperties": false
}
```

Submission Endpoints (Pilot)

- **Upload (preferred):** POST https://api.savchenkosolutions.com/pilot/upload
  Headers: Authorization: Bearer {API_KEY}, Content-Type: application/json
  Body: conforms to predictions.schema.json.

- **Fetch test slice:** GET /problems?split=test&limit=K (returns list of SS-* IDs).

Scoring Notes (Detail)

- **Numeric:** tolerant comparison ($|x - \hat{x}| \leq \epsilon \vee |x - \hat{x}|/|x| \leq \tau$); required units match; sig-fig sanity.

- **Symbolic:** normalize with SymPy (when possible), else exact/normalized string match (whitespace, common aliases).

- **Proof:** rubric on presence of claims/lemmas, correctness of key inference steps; sampled human audit for calibration.

- **Partial credit:** +1 final correct; +0.5 correct method with algebra slip; +0.2 correct setup only.

Governance & Public Reporting

- Public note contains methods and *aggregate* metrics; no prompts/weights/per-item outputs.

- Use of our name/logo in marketing requires written approval.

Contact

Aliaksandr (Alex) Melnichenka
aliaksandr@melnichenka.com — melnichenka.com