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**To the Editor-in-Chief**
*Journal of Systems and Software*
Elsevier

**Subject:** Submission of original research article

Dear Editor,

I am pleased to submit the enclosed manuscript entitled *IPFLang: A Domain-Specific Language with Currency-Safe Types and Static Verification for Regulatory Fee Calculations* for consideration for publication in the *Journal of Systems and Software*.

Regulatory fee calculations in domains such as intellectual property management involve complex, jurisdiction-specific rules that are typically implemented as ad-hoc code or spreadsheets, leading to errors and maintenance difficulties. This paper presents IPFLang, a domain-specific language that addresses these software engineering challenges through novel language design, a currency-aware type system, and static verification techniques.

This work is relevant to the *Journal of Systems and Software* as it presents contributions spanning language design, type systems, and program verification—validated through extensive real-world deployment.

**Contributions of this work are as follows:**

- **Currency-Aware Type System:** A dimensional type system supporting 161 ISO 4217 currencies with formal typing rules that prevent cross-currency arithmetic errors at compile time, accompanied by a type safety argument.
- **Static Verification Algorithms:** Novel algorithms for completeness checking (ensuring all input combinations are covered) and monotonicity verification (ensuring fee schedules behave correctly), with complexity analysis.
- **Language Design:** A complete EBNF grammar with declarative fee computation blocks, explicit input type declarations, temporal operators for date-dependent calculations, and jurisdiction composition for specification reuse.
- **Provenance Tracking:** Execution tracing showing how computed amounts derive from input parameters, with counterfactual analysis enabling what-if scenarios.
- **Comprehensive Validation:** An open-source reference implementation (GPLv3) validated with 261 test methods and 122 production specification files covering real-world fee schedules, achieving sub-millisecond execution performance.

The paper provides evidence supporting all claims through formal arguments, algorithmic complexity bounds, and empirical validation.

I confirm that this manuscript is original, has not been published elsewhere, and is not currently under consideration by another journal. I have no conflicts of interest to declare.

Thank you for your time and consideration of this work.

Sincerely,


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