ROUNDING VARIANTS PROPOSAL IMPLEMENTATION STATUS REPORT

abbreviations

ABBREVIATION	LONG VERSION
IA	interval arithmetic
the /ði:/ IEEE standard	IEEE 754

How is the feature going to be implemented?

communication

- **v8 ticket** https://groups.google.com/g/v8-dev/c/J5pHNIKBsGk/m/4m4hx9DyCAAJ
- **implementation insight** https://github.com/WebAssembly/rounding-mode-control/issues/2#issuecomment-2596913319

testcase example

...

key learnings

- f32 vs f64
- unary vs binary
- id
- ceil vs floor vs trunc

details

https://defuse.ca/online-x86-assembler.htm

```
  0:  0f ae 15 01 00 00 00    ldmxcsr DWORD PTR [rip+0x1]        # 0x8
  7:  a9 bf 5f 00 00          test   eax,0x5fbf
```

the areas of concern:

computer architecture

- explicit rounding variant
- AVX512, AVX10

compiler infrastructure

- allow high level integration
- clean, pure interface for the user
- allow for frontend/backend separation
- managable spec tensor

scientific computing

- comprehensive edge case testing
- enclosing property of IA
- allow for broader numerical experiments

performance

baseline: RoundingFiasco https://gitlab.com/pauldennis/rounding-fiasco/-/blob/main/README.md

- 13.77 MiB in size
- 658623 wasm instructions

```
Total opcodes: 658623

Opcode counts:
i32.const: 133415
global.get: 77890
local.get: 77706
i32.add: 73951
end: 47078
i32.load: 41298
i32.store: 36155
...
```

MVP:

- 5 standard hardware instructions instead of megabytes of slow user land emulation