fn get_min_k

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This proof resides in **"contrib"** because it has not completed the vetting process.

Proves soundness of the implementation of `get_min_k` in `mod.rs` at commit f5bb719 (outdated[1]).

1 Hoare Triple

Precondition

Compiler-Verified

- Generic `T` implements trait `Float`
- Type `i32` implements the trait `ExactIntCast<T.Bits>`, where `T.Bits` is the type of the native bit representation of `T`.

User-Verified

None

Pseudocode

```
def get_min_k() -> i32:
    return -i32.exact_int_cast(T.EXPONENT_BIAS) - i32.exact_int_cast(T.MANTISSA_BITS) + 1
```

Postcondition

Theorem 1.1.

Theorem 1.2. For every setting of the input parameters (`T`) to `get_min_k` such that the given preconditions hold, `get_min_k` raises an exception (at compile time or run time) or returns a valid transformation. A valid transformation has the following properties:

1. (Appropriate output domain). For every element x in `input_domain`, `function`(x) is in `output_domain` or raises a data-independent runtime exception.
2. (Stability guarantee). For every pair of elements x, x' in `input_domain` and for every pair (`d_in`, `d_out`), where `d_in` has the associated type for `input_metric` and `d_out` has the associated type for `output_metric`, if x, x' are `d_in`-close under `input_metric`, `stability_map`(`d_in`) does not raise an exception, and `stability_map`(`d_in`) $\leq$ `d_out`, then `function`(x), `function`(x') are `d_out`-close under `output_metric`.

Proof. □

[1] See new changes with `git diff f5bb719..fa860379 rust/src/measurements/noise/nature/float/utilities/mod.rs`