

fn then_deintegerize_vec

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

Proves soundness of the implementation of `then_deintegerize_vec` in `mod.rs` at commit `f5bb719` (outdated¹).

1 Hoare Triple

Precondition

Compiler-Verified

- Generic T0 implements trait `CastInternalRational`

User-Verified

None

Pseudocode

```
1 def then_deintegerize_vec(k: i32) -> Function[Vec[IBig], Vec[T0]]:
2   def element_function(x_i):
3     return T0.from_rational(x_mul_2k(RBig.from_(x_i), k))
4
5   return Function.new(lambda x: [element_function(x_i) for x_i in x])
```

Postcondition

Theorem 1.1. For every setting of the input parameters (k , $T0$) to `then_deintegerize_vec` such that the given preconditions hold, `then_deintegerize_vec` raises an exception (at compile time or run time) or returns a valid postprocessor. A valid postprocessor has the following property:

1. (Data-independent errors). For every pair of elements x, x' in `input_domain`, `function(x)`, `function(x')` either neither or both raise an error. If both raise an error, then they both raise the same error.

Proof. By the postcondition of `T0.from_rational`, the outcome of the function is the nearest representable float, and may saturate to positive or negative infinity. Since `T0.from_rational` and `x_mul_2k` are both infallible, the function is infallible, meaning that the function cannot raise data-dependent errors. Therefore the function is a valid postprocessor. \square

¹See new changes with `git diff f5bb719..1be10256 rust/src/measurements/noise/nature/float/mod.rs`