

## Ruby master - Feature #13506

### Improve performance of Complex#{+,-,\*,/,\*\*,abs2}

04/25/2017 05:25 AM - watson1978 (Shizuo Fujita)

<b>Status:</b>	Open
<b>Priority:</b>	Normal
<b>Assignee:</b>	
<b>Target version:</b>	

#### Description

At the internal calculation in Complex methods, it will just call Ruby #{+,-,\*,/} methods via rb\_funcall().

This patch will provide the optimization path for calculation using #{+,-,\*,/} methods for internal Fixnum objects.

#### Before

```
Calculating -----
Complex#+      5.186M (± 4.9%) i/s -   25.937M in  5.013851s
Complex#-      5.209M (± 5.9%) i/s -   26.038M in  5.017972s
Complex#*      3.211M (± 5.2%) i/s -   16.170M in  5.051605s
Complex#/     537.251k (± 3.9%) i/s -    2.691M in  5.017513s
Complex#**     1.540M (± 3.0%) i/s -    7.726M in  5.019918s
Complex#abs2   7.050M (± 7.9%) i/s -   35.047M in  5.009324s
```

#### After

```
Calculating -----
Complex#+      7.265M (± 4.6%) i/s -   36.341M in  5.013803s
Complex#-      7.310M (± 4.5%) i/s -   36.540M in  5.009521s
Complex#*      6.402M (± 4.0%) i/s -   32.060M in  5.016835s
Complex#/     541.564k (± 3.3%) i/s -    2.744M in  5.072620s
Complex#**     1.490M (± 4.0%) i/s -    7.506M in  5.046460s
Complex#abs2   17.799M (± 6.6%) i/s -   88.688M in  5.007732s
```

#### Test code

```
require 'benchmark/ips'

Benchmark.ips do |x|
  c1 = Complex(2, 3)
  c2 = Complex(2, 3)

  x.report "Complex#+" do |t|
    t.times { c1 + c2 }
  end

  x.report "Complex#-" do |t|
    t.times { c1 - c2 }
  end

  x.report "Complex#*" do |t|
    t.times { c1 * c2 }
  end

  x.report "Complex#/" do |t|
    t.times { c1 / c2 }
  end

  x.report "Complex#**" do |t|
    t.times { c1 ** c2 }
  end
end
```

```
x.report "Complex#abs2" do |t|
  t.times { c1.abs2 }
end
end
```

## Patch

<https://github.com/ruby/ruby/pull/1597>

## History

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**#1 - 06/24/2019 08:21 PM - jeremyevans0 (Jeremy Evans)**

- Backport deleted (2.2: UNKNOWN, 2.3: UNKNOWN, 2.4: UNKNOWN)
- Tracker changed from Bug to Feature