

# 可換的に引き算

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## 目録

```
1 module Op where
```

Implementation of Subtraction

```
2 data R = R Double deriving Show
```

Defining subtraction as following, hence satisfying  $a - b = b - a$ .

```
3 instance Num R where
4   (-) (R a) (R b) = case a>=b of
5       True  -> R $ a-b
6       False -> R $ b-a
7   fromInteger a = R $ abs x
8       where x = fromIntegral a::Double
9   signum (R a)
10      | a==0 = 0
11      | otherwise = 1
12   abs a = a
13   (*) _ _ = notImplemented
```

Now let's try to implement (+) normally

```
14   (+) (R a) (R b) = R $ a+b
```

But such implementation yields a wierd behaviour where (let a>b) then

$$b + (a - b) = a$$

$$a + (a - b) \neq b$$

## Extended Definition of Real Number Space

```
15 data R1 = R1 R Bool deriving Show
16 data R2 = R2 R Double deriving Show
```

```
17 instance Num R1 where
18     (-) a b = notImplemented
```

```
19     abs (R1 a _) = R1 a False
20     fromInteger a
21         | a >= 0 = R1 (R x) False
22         | a < 0  = R1 (R x) True
23         where x = fromIntegral a :: Double
24     signum (R1 (R a) d)
25         | a == 0 = 0
26         | d == True  = -1
27         | d == False = 1
28     (+) a b = notImplemented
29     (*) _ _ = notImplemented
```