

# A False Inequality

**Nassim Nicholas Taleb** @nntaleb · Apr 19, 2018  
@CutTheKnotMath  
Maestro, do you know where/if this Norm inequality has been proved?

For  $a_i, b_i \geq 1$ ,  $\sum_{i=1}^n a_i \geq \sum_{i=1}^n b_i$ ,  $p \geq 1$

Prove that  $\sum_{i=1}^n \sqrt[p]{a_i} \geq \sum_{i=1}^n \sqrt[p]{b_i}$

5 3 15

**Alexander Bogomolny** @CutTheKnotMath · Apr 19, 2018  
I do not think this is correct. With a change of variables you want to show that  $a+b > c+d \Rightarrow a^2+b^2 > c^2+d^2$ . Counterexample:  $c=1, a=5, b=6, d=8$

1

## Verification with Monte Carlo

```
In[ ]:= r := RandomInteger[{1, 10}, 3]
```

```

In[ ]:= X = Table[a = r;
               b = r; Sign[Total[a] - Total[b]] Sign[Total[a1/p] - Total[b1/p]], {106}] /. p -> 2 //
Histogram

```

Out[ ]:=

