

# Inequality with max I want to understand

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Hi,

I was reading a paper and hit an inequality I have never seen before:

$$(a + b) / (c + d) \leq \max (a/c, b/d)$$

In the paper I have the additional constraints that  $c > 0$ ,  $d > 0$ ,  $a \geq 0$ ,  $b \geq 0$ .

I am interested in where this comes from and other examples. If there are

books or other resources that contain stuff similar to this I would like to know.

I have no idea how I might search for something like this online for example.

I haven't sat down yet for an extended period to try and prove this.

I don't really have an idea of how to try and tackle it either.

Mathematica can find counter examples with negative variables but not with the additional constraints.

Thanks.

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