

## Discrete Math Challenge HW 6 (2 points)

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Consider the sum

$$\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \cdots + \frac{1}{n \cdot (n+1)}.$$

- (a) Write a Disco function `fracsum` :  $\mathbb{N} \rightarrow \mathbb{F}$  which computes the above sum for a given  $n$ . For example, `fracsum(2)` should output the sum  $1/(1 \cdot 2) + 1/(2 \cdot 3)$ .

*Hint:* your function should be recursive. Make sure your function is defined for every natural number input, including 0.

- (b) Evaluate your function for some example inputs and look for a pattern. Make a conjecture of the form

$$\forall n : \mathbb{N}. \text{fracsum}(n) = \dots$$

- (c) Use induction to prove your conjecture.