

**Assignment 7** (additional problem)

1. Use induction to prove that for all  $n \in \mathbb{N}^+$ ,

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

Comment: Its nice to write out this formula for the first few values of  $n$ :

$$\frac{1}{2} = \frac{1}{2}$$

$$\frac{1}{2} + \frac{1}{6} = \frac{2}{3}$$

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{12} = \frac{3}{4}$$

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} = \frac{4}{5}$$

and so on. Cool, eh?