Mathematics 3790H – Analysis I: Introduction to analysis
TRENT UNIVERSITY, Winter 2012

Assignment #7
Find the limit!
Due on Thursday, 8 March, 2012.

1. Suppose we define a sequence a_n as follows: $a_0 = \dfrac{1}{2}$ and $a_{n+1} = \dfrac{1}{1+a_n}$ for $n \geq 0$. Show that this sequence converges and find its limit. *[10]*

NOTE: To save the empirically inclined a little effort, here are the first few elements of the sequence:

n	a_n	decimal
0	$\frac{1}{2}$	0.5
1	$\frac{1}{1+\frac{1}{2}} = \frac{2}{3}$	0.66666666666666...
2	$\frac{1}{1+\frac{2}{3}} = \frac{5}{8}$	0.625
3	$\frac{1}{1+\frac{5}{8}} = \frac{8}{13}$	0.61538461538461...
4	$\frac{1}{1+\frac{8}{13}} = \frac{13}{21}$	0.61904761904761...
5	$\frac{1}{1+\frac{13}{21}} = \frac{21}{34}$	0.61764705882352...
⋮	⋮	⋮