

Assignment 4, MATH 6102

1. Use the known result on the rightward traveling waves for the Fisher-KPP equation to show that this equation also admits a leftward traveling wave $W(x + ct)$ for any $c \geq 2$.
2. Let $u(t, x)$ be the unique solution of the Fisher-KPP equation with the initial function $u(0, x)$ having compact support. Given $t > 0$ and $\rho > 0$, let $x_{\pm}^{\rho}(t)$ be the x -coordinates of the most right and left intersection points of the horizontal line $u = \rho$ and the graph of $u(t, x)$, respectively. Use the known spreading properties for solutions of the Fisher-KPP equation to prove that $\lim_{t \rightarrow \infty} \frac{x_{\pm}^{\rho}(t)}{t} = \pm 2$ uniformly for ρ in any compact interval $[a, b] \subset (0, 1)$.