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Second-Order Parabolic Partial Differential Equations > Fisher Equation

1.
$$\frac{\partial w}{\partial t} = \frac{\partial^2 w}{\partial x^2} + \alpha w(1 - w).$$

Fisher equation. This equation arises in heat and mass transfer, biology, and ecology.
Traveling-wave solutions:

$$w(x, t) = \frac{1}{\left[1 + C \exp\left(-\frac{5}{6}at \pm \frac{1}{6}\sqrt{6a}x\right)\right]^2},$$
$$w(x, t) = \frac{1 + 2C \exp\left(-\frac{5}{6}at \pm \frac{1}{6}\sqrt{6a}x\right)}{\left[1 + C \exp\left(-\frac{5}{6}at \pm \frac{1}{6}\sqrt{6a}x\right)\right]^2},$$

where C is an arbitrary constant.

References

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