

Solution two-point boundary problems by phase plane analysis

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We show how to solve two-point boundary value problems

$$\begin{aligned}u_{xx} + f(u) &= 0 && \text{for } x \in [0, 1] \\u_x(0) = u_x(1) &= 0\end{aligned}$$

by defining the potential and investigating timemaps. At first we assume that f is continuous and as a second step we construct solutions for f having a discontinuity.