Generalized Three Critical Point Theorem for Relativistic Equations with Applications

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Abstract: This talk presents an extension of the Pucci and Serrin three critical point theorem to convex lower semicontinuous perturbations of $\mathcal{C}^1$ functionals in Banach spaces. The extension is applied to establish the existence of three solutions for a one-parameter family of relativistic problems with zero Dirichlet boundary conditions. In particular,

$$\left(\frac{q'}{\sqrt{1-|q'|^2}}\right)' = (m|q|^{m-2} - \lambda p|q|^{p-2}) \cdot q,$$

$$q(0) = q(T) = 0,$$

where $p > m > 2$ and $T > 0$.

These problems represent a simplified version of the relativistic Lorentz force equation, devoid of magnetic field influence. This extension broadens the theorem's scope to encompass relativistic scenarios, opening avenues for applications across physics and applied mathematics.

References:

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