

**Multiple entire solutions to the curl-curl problem with
critical exponent**

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We prove the existence of infinitely many solutions with diverging energy to the problem

$$\nabla \times \nabla \times \mathbf{U} = |\mathbf{U}|^4 \mathbf{U} \quad \text{in } \mathbb{R}^3.$$

We consider vector fields of the form

$$\mathbf{U}(x) = \frac{u(x)}{r} \begin{pmatrix} -x_2 \\ x_1 \\ 0 \end{pmatrix}$$

with $r = \sqrt{x_1^2 + x_2^2}$ and $u(x) = u(r, x_3)$ to reduce the curl-curl operator to the vector Laplacian; at the same time we consider an isometric isomorphism between $\mathcal{D}^{1,2}(\mathbb{R}^3, \mathbb{R}^3)$ and $H^1(\mathbb{S}^3, \mathbb{R}^3)$ to recover compactness.