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An Upper Bound for the Least Energy of a Nodal Solution to the Yamabe Equation on the Sphere

For each $n \geq 3$ we establish the existence of a nodal solution u to the Yamabe problem on the round sphere (\mathbb{S}^n, g) which satisfies

$$\int_{\mathbb{S}^n} |u|^{2^*} dV_g < 2m_n \text{vol}(\mathbb{S}^n),$$

where $m_3 = 9$, $m_4 = 7$, $m_5 = m_6 = 6$, and $m_n = 5$ if $n \geq 7$.

Keywords: Yamabe equation, nodal solutions, energy bounds.

MSC: 58J05, 35B06, 35B33.