On a class of degenerate and singular elliptic systems in bounded domains

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Abstract: This paper deals with the nonexistence and multiplicity of nonnegative, nontrivial solutions to a class of degenerate and singular elliptic systems of the form 
\[ \begin{align*}
\text{(- div (} h_1 (x) u) &= \lambda F_u (x, u, v), \text{ in } \Omega; \\
\text{- div (} h_2 (x) v) &= \lambda F_v (x, u, v), \text{ in } \Omega,)
\end{align*} \]
where \( \Omega \) is a bounded domain with smooth boundary \( \partial \Omega \) in \( \mathbb{R}^N \), \( N \geq 2 \), and \( h_1, h_2 : \Omega \to [0, \infty) \), \( h_i \in L^1_{\text{loc}} (\Omega) \), \( i = 1, 2 \) are allowed to have "essential" zeroes at some points in \( \Omega \), \( (F_u, F_v) = F \), and \( \lambda \) is a positive parameter. Our proofs rely essentially on the critical point theory tools combined with a variant of the Caffarelli-Kohn-Nirenberg inequality in [P. Caldiroli, R. Musina, On a variational degenerate elliptic problem, NoDEA Nonlinear Differential Equations Appl. 7 (2000) 189-199]. © 2009 Elsevier Inc. All rights reserved.

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