

## Some perturbation theorems for nonlinear eigenvalue problems

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Nonlinear eigenvalue problems occur naturally when looking at differential equation models that include damping, radiation, or delay effects. Such problems also arise when we reduce a linear eigenvalue problem, as occurs when we rewrite a PDE eigenvalue problem in terms of a boundary integral equation. In each of these cases, we are interested in finding where a locally meromorphic matrix-valued function  $A(z)$  is singular, and relating that information to the local dynamics of a system. In this talk, we extend some perturbation results from the analysis of ordinary eigenvalue problems to this more general case, and give some examples of error analysis based on our results.