Bifurcation theorem via second variation

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We state new necessary conditions for existence of bifurcation in abstract nonlinear functional equation, using analytical tools (second variation of the functional at equilibrium point). We examine some relations between different methods in bifurcation theory (analytical, topological, variational). Furthermore, applying the theorem to the Fredholm operators with zero index, we obtain classical results of Hopf and Crandall-Rabinowitz. Consequently, we redefine Hopf bifurcation and establish its relations with the Hopf fibration. Finally, we explain technique required to apply abstract result to dynamical systems described by ODEs, PDEs, DDEs