10. ———, *A necessary condition that a cellular upper semicontinuous decomposition of E^n yield E^n*, Trans. Amer. Math. Soc. **122** (1966), 427–435.

11. ———, *Decompositions of S^3 and pseudo-isotopies*, Notices Amer. Math. Soc. **15** (1968), 103.

12. W. Voxman, *Decompositions of 3-manifolds and pseudo-isotopies*, Notices Amer. Math. Soc. **15** (1968), 547.

13. ———, *On the shrinkability of decompositions of 3-manifolds*, Notices Amer. Math. Soc. **15** (1968), 649.

UNIVERSITY OF IOWA, IOWA CITY, IOWA 52240

ON ONE PARAMETER FAMILIES OF REAL SOLUTIONS OF NONLINEAR OPERATOR EQUATIONS

BY MELVYN S. BERGER[1]

Communicated by Avner Friedman, November 6, 1968

Let H be a separable Hilbert space over the real numbers. Denote by L, M, N bounded mappings of H into itself. In an earlier note [1] the author studied the solutions $u \in H$ of operator equations of the form

$$u + Mu = \lambda\{Lu + Nu\} \tag{1}$$

under the assumption that such solutions be contained in a sufficiently small sphere with center at $u=0$. Here we assume that L, M, and N are odd, completely continuous, locally Lipschitzian gradient mappings of H into itself, and λ is a real parameter. We wish to announce some results concerning the global structure of solutions of (1) and some applications of these results to problems arising in the calculus of variations. Proofs of these results will appear elsewhere.

1. Statements of results. Suppose $\mathfrak{M}$ and $\mathfrak{N}$ are even functionals such that grad $\mathfrak{M}=M$ and grad $\mathfrak{N}=N$, then we set $F(u) = (1/2)\|u\|^2+\mathfrak{M}(u)$ and $G(u)=(1/2)(Lu,u)+\mathfrak{N}(u)$, and $\partial A_R = \{u \mid F(u)=R,\ R \text{ a fixed real number}\}$. Associated with (1) we consider its linearization at $u=0$

$$u = \lambda Lu. \tag{2}$$

We assume $(Lu, u)>0$ for $u\neq 0$ so that the eigenvalues of (2) $\{\lambda_i\}$ form an increasing sequence of real numbers $0<\lambda_1\leqq\lambda_2\leqq\lambda_3 \cdots$.

[1] Research partially supported by NSF GP-7041X.