2. David Kleinecke, *Almost-finite, compact and inessential operators*, Proc. Amer. Math. Soc. **14** (1963), 863–868.

3. S. R. Caradus, *Operator of Riesz type*, Pacific J. Math. **18** (1966), 61–71.

4. I. C. Gohberg and M. G. Krein, *Fundamental aspects of defect numbers, root numbers, and indices of linear operators*, Uspehi Mat. Nauk. **12** (1957), 43–118.

5. Shmuel Kaniel and Martin Schechter, *Spectral theory for Fredholm operators*, Comm. Pure Appl. Math. **16** (1963), 423–448.

6. I. A. Feldman, I. C. Gohberg and A. S. Markus, *Normally solvable operators and ideals associated with them*, Izv. Moldavsk Filiala Akad. Nauk. SSSR, **10** (1960), 51–69.

7. Bertram Yood, *Difference algebras of linear transformations on a Banach space*, Pacific J. Math. **4** (1954), 615–636.

8. ———, *Properties of linear transformations preserved under addition of a completely continuous transformation*, Duke Math. J. **18** (1951), 599–612.

9. A. F. Ruston, *Operators with Fredholm theory*, J. London Math. Soc. **29** (1954), 318–326.

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THE CENTRALIZER OF A REGULAR UNIPOTENT ELEMENT IN A SEMISIMPLE ALGEBRAIC GROUP

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The following question was posed by Springer [2]: is the centralizer G_x of a regular unipotent element x in a semisimple algebraic group G abelian? In this paper we shall give an affirmative answer and also find the number of disjoint components of G_x if it is reducible. The problem is easily reduced to the case in which G is simple, which we henceforth assume. As proved by Springer in [2], reducibility occurs only when the type of G and the characteristic p of the base field Φ are related as follows: C_n $(n \geqq 2)$ and D_n $(n \geqq 4)$ with $p=2$ (here B_n is a homomorphic image of C_n and need not be considered); F_4, G_2, E_6, E_7, with $p=2$, 3 and E_8 with $p=2$, 3, 5.

We shall now sketch our development. We recall that an element x of G is regular if its centralizer G_x has dimension equal to the rank, say r, of G, and that an element is unipotent if its eigenvalues are all 1. Relative to a Cartan decomposition of G let U be the maximal

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