flow corresponding to a Hamiltonian vector field preserves the volume (see Abraham-Marsden (1978, Sec.3.3). Thus assertion (ii) of Proposition 4.11(a) is trivially satisfied.

Further examples of flows which are measure preserving and therefore induce semigroups of lattice homomorphisms on L^p-spaces are billiard flows on compact convex subsets of $\mathbb{R}^n$ and geodesic flows on Riemannian manifolds (see Cornfeld-Fomin-Sinai (1982)).

NOTES.

Spectral theory for a single positive operator as developed in Chapter V of Schaefer (1974) is an essential tool for this chapter. Various results on the spectral theory of positive one-parameter semigroups can be found in Chapter 7 of Davies (1980) and in the second part of Batty-Robinson (1984).

Section 1. That the spectral bound is always an element of the spectrum was stated by Karlin (1959), but a valid proof was given by Derndinger (1980). This assertion as well as assertion (b) of Theorem 1.1 allow generalizations in various directions: They are valid for ordered Banach spaces (see Greiner-Voigt-Wolff (1981) and Klein (1984)) and one only needs that A has positive resolvent (see Kato (1982) or Nussbaum (1984)). Theorem 1.2 as well as its corollaries are also valid in ordered Banach spaces. For the analogue in the theory of the Laplace transform we refer to Sec.10.5 in Widder (1971) and Voigt (1982).

Section 2. Theorem 2.2 is the basis for the subsequent cyclicity results. Pseudo-resolvents are discussed e.g. in Hille-Phillips (1957) or Yosida (1965). For non-positive semigroups the two assertions stated in Def.2.8 are no longer equivalent. A special case of Theorem 2.10 was proven by Derndinger (1980) while the general result is due to Greiner (1981). Instead of pseudo-resolvents on the whole F-product Derndinger works with the semigroup on the semigroup F-product. Therefore he can only consider eigenvalues. Elliptic differential operators as generators of positive semigroups are discussed by many authors, e.g., Amann (1983), Fattorini (1983), Friedmann (1972) or Pazy (1983).

Section 3. There exist various notions which are (more or less closely) related to irreducibility, e.g. 'positivity improving' in Reed-Simon (1979), u_0-positivity in Krasnosel'skii (1964) or 'quasi-strictly positive' in Karlin (1959)). Sawashima (1964) uses 'non-support' instead of irreducible. She also discusses several modifications (semi-non-support, strictly non-support, strongly positive) and the inter-relationship between these notions. The notion of irreducibility can be extended to the (non-lattice) ordered setting (see Batty-Robinson (1984)). Assertion (b) of Theorem 3.2 is due to Majewski-Robinson (1983) while special cases can be found in Sec. XIII.12 of Reed-Simon (1979) and in Kishimoto-Robinson (1981). Proposition 3.3 is due to Voigt (1984). Retarded equations as dicussed in Example 3.4(c) will be discussed in more detail in Section 3 of C-IV. Example 3.4(d) is a one-dimensional version of the linear transport equation. The higher dimensional equation is more delicate but can be treated similarly (see e.g. Greiner (1984), Kaper-Lekkerkerker-Hejtmanek (1983), or Voigt (1984b)). A special case of Proposition 3.5 can be found