Jarmo Malinen: *A remark on the Hille–Yoshida generator theorem*; Helsinki University of Technology Institute of Mathematics Research Reports A469 (2004).

Abstract: *It is well-known (and can be proved in a number of ways) that a densely defined, closed operator A generates a bounded C_0-semigroup if (and only if) the Hille–Yoshida resolvent condition*

$$\|(s_j - A)^{-k}\| \leq \frac{M}{s_j^k} \tag{1}$$

holds for some positive and unbounded sequence $\{s_j\}_{j\geq 1}$. We give a novel and short "frequency domain" proof for the observation that the resolvent condition (1)*, indeed, is* only *required for such sequences $\{s_j\}_{j\geq 1}$. The proof is based on studying the analytic function $s \mapsto (I - A/s)^{-1}$ whose values are power bounded operators.*

AMS subject classifications: 47D03, 47A10, 47A30

Keywords: Semigroup generator, Hille–Yoshida theorem, Gibsons theorem

Jarmo.Malinen@hut.fi

ISBN 951-22-7017-X
ISSN 0748-3143
Espoo, 2004

Helsinki University of Technology
Department of Engineering Physics and Mathematics
Institute of Mathematics
P.O. Box 1100, 02015 HUT, Finland
email:math@hut.fi http://www.math.hut.fi/