Letters in Mathematical Physics **17** (1989) 173–174.

Errata

H. Grundling and C. A. Hurst: 'A Note on Regular States and Supplementary Conditions', *Lett. Math. Phys.* **15**, 205–212 (1988). (Received: 16 August 1988.)

The following corrections should be made.

(1) The ETCR on p. 206 should read:

$$[q_i(x), p_j(x')]_{x_0 = x_0'} = ig_{ij}\, \delta^3(\mathbf{x} - \mathbf{x}')\,.$$

(2) The nontriviality condition on p. 208 should read:

$$\wp_D \neq \emptyset \quad \text{iff} \quad B(\mathscr{C}, \mathscr{C}) = 0 \quad \text{iff} \quad \mathbf{1} \notin C^*(\delta_{\mathscr{C}} - \mathbf{1})\,.$$

(3) The third line of the proof of Theorem 3.1 should read:

$$\omega(\delta_{F+\lambda C}) \exp \frac{i}{2} B(F, \lambda C) = \omega(\delta_F) = \omega(\delta_{F+\lambda C}) \exp \frac{-i}{2} B(F, \lambda C)\,.$$

(4) The proof of Theorem 3.2(ii) has an error, in that the simultaneous eigenvector ξ may not have the same eigenvalue 1 for all operators $\pi(\delta_C)$, $C \in \mathscr{C}$. However, 3.2(ii) is contained in the following stronger statement:

THEOREM. *If $\pi \in \tilde{P}$, then $\nexists C \in \mathscr{Q}\backslash 0$ for which $1 \in P\sigma_{\mathscr{H}_\pi}(\pi(\delta_C))$.*

Proof: Let $\pi \in \tilde{P}$ be the GNS-representation of a state $\omega \in \wp_R$, then from the weak continuity we know that all vector states associated with ω are also in $\wp_R$. Assume $\exists C \in \mathscr{Q}\backslash 0$ such that $1 \in P\sigma_{\mathscr{H}_\pi}(\pi(\delta_C))$, i.e. $\exists \xi_C \in \mathscr{H}_\pi$ for which $\pi(\delta_C)\xi_C = \xi_C$, so for the associated vector state, $\omega_C(\delta_C) := (\xi_C, \pi(\delta_C)\xi_C) = 1$, and indeed $\omega_C(\delta_{nC}) = 1\ \forall n \in \mathbf{Z}$. Since the symplectic form B is nondegenerate, we know $\exists F \in \mathscr{Q}$ such that $B(F, C) \neq 0$. Using the Cauchy–Schwartz inequality:

$$|\omega_C((\delta_C - \mathbf{1})\delta_{\lambda F})|^2 \leqslant \omega_C((\delta_C - \mathbf{1})^*(\delta_C - \mathbf{1}))\omega_C(\delta_{\lambda F}^*\delta_{\lambda F})$$
$$= \omega_C(2 - \delta_C - \delta_{-C}) = 0$$

we find $\omega_C((\delta_C - \mathbf{1})\delta_{\lambda F}) = 0\ \forall \lambda \in \mathbb{R}$, and similarly that $\omega_C(\delta_{\lambda F}(\delta_C - \mathbf{1})) = 0 \forall \lambda \in \mathbb{R}$. Then $\forall \lambda \in \mathbb{R}$:

$$\omega_C(\delta_{C+\lambda F}) \exp \frac{-i}{2} B(C, \lambda F) - \omega_C(\delta_{\lambda F})$$

$$= 0 = \omega_C(\delta_{C+\lambda F}) \exp \frac{i}{2} B(C, \lambda F) - \omega_C(\delta_{\lambda F})$$

If for $\lambda \neq 0$ we take $\omega_C(\delta_{C+\lambda F}) \neq 0$, then $B(C, \lambda F) = 4n\pi$, $n \in \mathbf{Z}$, $\forall \lambda \in \mathbb{R}\backslash 0$, and since $B(C, F) \neq 0$, this is impossible to satisfy for all $\lambda \in \mathbb{R}\backslash 0$, so we conclude that $\omega_C(\delta_{C+\lambda F}) = 0 \;\; \forall \lambda \notin 4\pi\mathbf{Z}/B(F, C)$, hence $\omega_C(\delta_{\lambda F}) = 0 \;\; \forall \lambda \in (0, 4\pi/B(F, C))$. Since $\omega_C(\delta_0) = 1$, this means that ω_C is not regular, which contradicts $\omega \in \wp_R$, and so the assumption $\exists C \in \mathscr{Q}\backslash 0$ such that $1 \in P\sigma_{\mathscr{H}_\pi}(\pi(\delta_C))$ must be wrong. □

M. Puta: 'On the Geometric Prequantization of Poisson Manifolds', *Lett. Math. Phys.* **15**, 187–192 (1988). (Received: 20 September 1988.)

Recently, Professor A. Weinstein has pointed out to me that there is a mistake in my paper. The situation is the following. In Definition 3 (p. 189), condition (ii) implies that the Poisson structure Λ_0 is a trivial one. Indeed, Γ_0 is a Lagrangian submanifold of Γ and then for each $f, g \in C^\infty(\Gamma_0)$ we have $i^*\omega(X_f, X_g) = 0$, or, equivalent, $\Lambda_0(\mathrm{d}f, \mathrm{d}g) = 0$, where $\Gamma_0 \overset{i}{\hookrightarrow} \Gamma$ is the canonical inclusion of Γ_0 in Γ. It follows that Λ_0 is trivial, i.e. $\Lambda_0 = 0$.

To avoid this situation, instead of Definition 3, we must consider the following one: A Poisson manifold (Γ_0, Λ_0) is quantizable if its symplectic realization (Γ, ω) is a quantizable one. Under this definition, our Example (p. 189) remains true and the construction of the Hermitian line bundle $(L^0, \pi_0, \Gamma_0, \dot{\nabla})$ also holds. Having the same motivation as for the symplectic case, we can construct the differential operator $\mathring{\delta}$ (p. 191, line 7) and then points (i), (iii), (iv) of Theorem 2 (p. 191) still stand. Unfortunately, point (ii) of the theorem is violated and, therefore, our operator $\mathring{\delta}$ is not a true prequantum operator. Theorem 3 (p. 192) also drops.

It is an open problem to decide if we can restrict our considerations to a Poisson subalgebra of $C^\infty(\Gamma_0)$ such that the above condition (ii) to satisfied.

For the particular case $\Lambda_0 = 0$. Theorem 2 and 3 are verified and, in this case, $\mathring{\delta}$ is a true prequantum operator.