$$= \hat p\left(\widehat{f_0 g} + O(h)\right) + O(h) = \hat p\, \widehat{f_0 g} + O(h) \overset{\text{по (v)}}{=} \widehat{p f_0 g} + O(h) = \widehat{fg} + O(h),$$ ч. т. д.

Док-ем (2): Аналогично $f = p f_0$, тогда

$$[\hat f, \hat g] = [\widehat{pf_0}, \hat g] = \widehat{pf_0}\,\hat g - \hat g\, \widehat{pf_0} \overset{\text{по (v)}}{=} \left(\hat p \hat f_0 + \frac{ih}{2}\cdot\widehat{\frac{\partial f_0}{\partial x}}\right)\hat g - \hat g\left(\hat p \hat f_0 + \frac{ih}{2}\,\widehat{\frac{\partial f_0}{\partial x}}\right) = \frac{ih}{2}\left[\widehat{\frac{\partial f_0}{\partial x}}, \hat g\right] + \hat p\hat f_0 \hat g \underbrace{- \hat p \hat g \hat f_0 + \hat p\hat g\hat f_0}_{\text{добав. и вычли}} - \hat g\hat p\hat f_0 =$$

$$= \frac{ih}{2}\left[\widehat{\frac{\partial f_0}{\partial x}}, \hat g\right] + \hat p[\hat f_0,\hat g] + [\hat p,\hat g]\hat f_0 \qquad = \hat p\left(-ih\widehat{\{f_0,g\}}\right) -$$

$\deg \frac{\partial f_0}{\partial x} + \deg g \le m$
и это есть $O(h^2)$

а для этих
моном-ов ф-ла
уже доказана

$$- ih \widehat{\{p,g\}}\, \hat f_0 + O(h^2) \overset{\text{по (v)}}{=} -ih\left(\widehat{p\{f_0,g\} + \{p,g\} f_0}\right) + O(h^2) =$$

$$= -ih\hat{\mathfrak g} + O(h^2), \quad \text{где} \quad \mathfrak g = p\{f_0,g\}+\{p,g\}f_0$$

$$\{f,g\} = \frac{\partial f}{\partial p}\frac{\partial g}{\partial x} - \frac{\partial f}{\partial x}\frac{\partial g}{\partial p} = \frac{\partial}{\partial p}(pf_0)\frac{\partial g}{\partial x} - p\frac{\partial f_0}{\partial x}\frac{\partial g}{\partial p} - f_0\frac{\partial p}{\partial x}\frac{\partial g}{\partial p} =$$

$$= -f_0\frac{\partial p}{\partial x}\frac{\partial g}{\partial p} + \frac{\partial f_0}{\partial p}\frac{\partial g}{\partial x}p - p\frac{\partial f_0}{\partial x}\frac{\partial g}{\partial p} + \frac{\partial g}{\partial x}f_0 = p\{f_0,g\}+\{p,g\}f_0 = \mathfrak g,$$ ч. т. д.

Многомерное квантование.

$x=(x_1,\dots,x_n)$, т.е. пр-во состояний это $\mathbb R^{2n}$.
$p=(p_1,\dots,p_n)$

Наблюд-мые: ф-ции $2n$ перем-х $f(x,p)$: $\mathbb R^{2n}\to\mathbb R$.
Динамика зад-ся так же, как и в одном. случае с пом. ур-ий Гам-на: $\dot x_j = \frac{\partial H}{\partial p_j}$; $\dot p_j = -\frac{\partial H}{\partial x_j}$

$$\omega = \sum_{j=1}^n dp_j\wedge dx_j \quad ; \quad f \longrightarrow v(f) \quad ; \quad \omega(\xi, v(f)) = df(\xi)$$