Errata for PHYS2100 notes, Hamiltonian dynamics and chaos 2006.
Last updated: Tuesday 17th October 2006.

• Page 10: There is a square root missing in Eq. (2.27), which should read

$$I = \pi \times \sqrt{\frac{2H}{m\omega^2}} \times \sqrt{2mH} = \frac{2\pi}{\omega} H.$$

• Page 10: The sign of Eq. (2.29) is incorrect. It should read

$$F(q) = aq, \qquad a > 0.$$

• Page 11: The m^2 that is present in Eq. (2.32) should not be there. The equation should be

$$2mH = p^2 - \gamma^2 q^2, \qquad \left(\gamma = \frac{a}{m}\right).$$

• Page 11: In Fig 2.5, the arrowheads for the $H = -1$ trajectories are pointing in the wrong direction.

• Page 14: In Fig 2.6, the four arrowheads on the furthest right are pointing in the wrong direction.

• Page 17: In Eq. (2.72) the ω_0 should actually be ω_0^2, i.e.

$$\ddot{\gamma} = \omega_0^2 \gamma$$

• Page 24: In Eq. (3.17) the second to last term on the right should be $\partial H/\partial p$, rather than $\partial H/\partial q$. Thus the full equation is

$$\{q, H\}_{(q,p)} = \frac{\partial q}{\partial q}\frac{\partial H}{\partial p} - \frac{\partial q}{\partial p}\frac{\partial H}{\partial q} \;=\; 1 \times \frac{\partial H}{\partial p} - 0 \times \frac{\partial H}{\partial q} \;=\; \frac{\partial H}{\partial p} \;=\; \dot{q}.$$

• Page 25: In Eq. (3.22) the second term on the RHS should be $\partial H/\partial p$, rather than $\partial Q/\partial q$. Thus the full equation should read

$$= \frac{\partial Q}{\partial q}\frac{\partial H}{\partial p} + \frac{\partial Q}{\partial p}\left(-\frac{\partial H}{\partial q}\right).$$

• Page 27: In Eq. (3.39) the integration should be over a dummy position variable, and thus should read

$$W = \int_0^q p(I, q')\, dq'.$$

Likewise, Eq. (3.40) should be

$$\text{Area} \quad \delta W = \int_0^q \delta p\, dq' \qquad = \qquad \delta I\, \theta.$$

and Eq. (3.42)

$$\theta = \frac{\partial}{\partial I} \int_0^q p(I, q')\, dq'.$$

• Page 27: Eq. (3.43) is missing a $\partial/\partial I$ in front of the last integral on the line, i.e.

$$\Delta\theta \;=\; \oint \frac{\partial \theta}{\partial q}\, dq \;=\; \oint \frac{\partial^2 W}{\partial q \partial I}\, dq \;=\; \frac{\partial}{\partial I} \oint \frac{\partial W}{\partial q}\, dq.$$

• Page 28: The ℓs in the arguments of the functions in Eq. (3.46) should be Is

$$\phi(\theta + 2\pi, I) = \phi(\theta, I), \qquad \ell(\theta + 2\pi, I) = \ell(\theta, I).$$

• Page 29: Eq. (3.56) is missing a ω in the denominator

$$\frac{2H}{\pi\omega} \int_{-\pi/2}^{\pi/2} \cos^2 \phi\, d\phi,$$

• Page 29: Eq. (3.58) is missing some brackets

$$\theta(t) = \omega t + \delta.$$

• Page 32: The LHSs of Eq. (3.79) are missing some brackets

$$\begin{array}{lll} \omega(\Lambda) \to \omega_0 & \text{as} & \Lambda \to 0, \\ \omega(\Lambda) \to 0 & \text{as} & \Lambda \to 1, \\ \omega(\Lambda) \to 2\Lambda\omega_0 & \text{as} & \Lambda \to \infty. \end{array}$$

• Page 34: The y-axis label of Fig 3.6(b) and 3.6(c) have been switched. However, the caption gives the corrected description.