Models for Quantifying Risk --Sixth Edition
Solutions Manual
Errata List
September 19, 2014

Page 121:
Beginning with the ninth line, the one immediately following the long centered equation, the solution should read:

"As expected, the left side integrates to ${}_n p_{xy}^{03}$, since ${}_0 p_{xy}^{03} = 0$. The challenge is now to translate the terms on the right side, which are written in multi-state model notation, into the actuarial notation defined for the common shock model in Section 12.7. Clearly ${}_t p_{xy}^{00}$ translates to ${}_t p_{xy}$, the probability that both (x) and (y) have survived against all hazard forces, and $\mu_{x+t:y+t}^{03}$ translates to λ, the common shock force of failure to which both (x) and (y) are subject. The term ${}_t p_{xy}^{01}$ is the probability that (x) is alive, but (y) is not, at time t. To satisfy this event, (x) must have survived all hazard factors, including the common shock ones, and (y) must have failed *due to hazard factors unique to* (y). (If (y) had failed due to a common shock hazard factor, then (x) could not be alive.) The term μ_{x+t}^{13} is the force of failure operating on (x) after the failure of (y), so it includes only the hazard factors unique to (x), which is denoted μ_{x+t}^{*} in actuarial notation. The third pair of terms is similarly analyzed, with the roles of (x) and (y) reversed. Then the equation, written in common shock actuarial notation, is

$${}_n p_{xy}^{03} = \int_0^n \left[{}_t p_{xy} \cdot \lambda + \left(1 - {}_t p_y^*\right) \cdot {}_t p_x \mu_{x+t}^* + \left(1 - {}_t p_x^*\right) \cdot {}_t p_y \mu_{y+t}^* \right] dt$$

$$= \lambda \cdot \mathring{e}_{xy:\overline{n}|} + \left({}_n q_{xy}^{2}\right)^* + \left({}_n q_{x\overset{2}{y}}\right)^* = {}_n q_{\overline{xy}}^* + \lambda \cdot \mathring{e}_{xy:\overline{n}|},$$

as required. (Note that both $\left({}_n q_{xy}^{2}\right)^*$ and $\left({}_n q_{x\overset{2}{y}}\right)^*$ denote the failure of both persons (in opposite orders) before time n due to hazard forces unique to each person.)"