4. Calculate the geomagnetic latitude of the earth projection of the ionospheric intersection point:

$$\lambda_m = \lambda_i + 0.064 \cos(\phi_i - 1.617) \tag{E.11}$$

5. Use the β terms from the GPS message to calculate the period:

$$\text{PER} = \begin{cases} \sum_{n=0}^{3} \beta_n (\lambda_m)^n & \text{if PER} \geq 72{,}000 \\ 72{,}000 & \text{if PER} < 72{,}000 \end{cases} \tag{E.12}$$

6. Calculate the argument of the cosine term:

$$x = \frac{2\pi(t - 50{,}400)}{\text{PER}} \tag{E.13}$$

7. Calculate the slant factor:

$$F = 1.0 + 16.0(0.53 - E)^3 \tag{E.14}$$

8. Use the α terms from the GPS message to calculate the amplitude:

$$\text{AMP} = \begin{cases} \sum_{n=0}^{3} \alpha_n (\lambda_m)^n & \text{if AMP} \geq 0 \\ 0 & \text{if AMP} < 0 \end{cases} \tag{E.15}$$

9. Calculate the L1 ionospheric correction:

$$t1_{\text{ion}} = \begin{cases} F * \left[5 \times 10^{-9} + \text{AMP}\left(1 - \frac{x^2}{2} + \frac{x^4}{24}\right)\right] & \text{if } |x| < 1.57 \\ F * 5 \times 10^{-9} & \text{if } |x| \geq 1.57 \end{cases} \tag{E.16}$$

A three-term (fourth-order) expansion of the cosine has been used.

10. If needed, calculate the L2 ionospheric correction:

$$t2_{\text{ion}} = \frac{77^2}{60^2} t1_{\text{ion}} \tag{E.17}$$