The ground segment uses Eqs. (E.3) and (E.4) as written to determine the polynomial-based estimate for the clock correction; however, this results in a coupled set of equations for the user. Sensitivity analysis has shown [73] that it is sufficiently accurate to approximate t by t_{sv} in Eq. (E.4).

The parameter t_{oc} is the reference time for the applicability of the clock-correction data. The difference $(t - t_{oc})$ is not expected to be large. In fact, the difference is assumed to lie in the interval [−302,400, 302,400] seconds, whose length corresponds to the number of seconds in a GPS week. However, since t_{oc} is expressed in seconds of a given GPS week, it may happen near the beginning or end of a week that t is referenced to one week while t_{oc} is referenced to a different week. In such cases $|t - t_{oc}|$ would be greater than 302,400 s. When this occurs the user is responsible for reflecting $(t - t_{oc})$ back into the proper range by aiding or subtracting 604,800 s.

The parameter IODC in Table E.1 is an integer that allows the user to detect when new clock model parameters are available. By monitoring IODC of the incoming satellite signal relative to the IODC of the clock parameters currently in use, the user can determine when to update the clock model parameters.

E.2 Satellite Position Calculations

The ephemeris parameters describe the orbit during a given interval of time (at least 1 h). The ephemeris parameters are the parameters for an extension of the orbital model predicted by Kepler. The extension is necessary to account for nonuniformities in the earth gravitational field. The ephemeris parameters are determined by the control segment as a curve fit to the measured satellite orbit. The parameter t_{oe} is the reference time of applicability (local origin) of the ephemeris parameters.

The ephemeris parameters are defined in Table E.1 [73]. These parameters are broadcast by the satellites and available from the receiver after decoding by the receiver. The units of the broadcast parameters are also defined in the table.

The ECEF coordinates for the phase center of the satellite antenna can be calculated with a variation of the equations shown in Table E.2 [144]. The satellite antenna phase center position is very sensitive to small perturbations in most ephemeris parameters [73]. The sensitivity of position to the parameters $\sqrt{A}$, C_{rc}, and C_{rs} is ~1 m/m. The sensitivity to angular parameters is of the order of 10^8 m/semicircle and to the angular rate parameters is of the order of 10^{12} m/(semicircle/s). Because of this extreme sensitivity to angular perturbations, the values of all constants should exactly match those stated in App. A, from Ref. [73].

The parameter IODE is an integer that allows the user to detect when a new set of ephemeris parameters is available. By monitoring the IODE value for the incoming satellite signal relative to the IODE of the ephemeris data currently in use, the user can determine when to update the ephemeris model parameters.