

# Main differences between V4.11 and V4.10

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**PATRIUS** V4.11 is a major release adding some new features and correcting some bugs.

## New functionalities

- Circular parameters can now accept hyperbolic orbits
- Broadcast ephemerides models (CNAV and LNAV) for the computation of GNSS trajectories have been added
- Several new detectors have been added
- New class GeodeticTargetDirection to define the direction passing by a GeodeticPoint and a BodyShape
- New class MeteorologicalConditions which encapsulates data about temperature, pressure and humidity
- It is now possible to compute the primitive of a PolynomialFunction and of a ChebyshevPolynomialFunction
- The native frame of a CelestialBody is now the ICRF
- The gravity models are now distinct from the force models (to add a gravity model to the list of force models, the class DirectBodyAttraction should now be used as a wrapper)
- The NumericalPropagator and the MultiNumericalPropagator do not use anymore the Newtonian gravity model by default (it should now be added manually to the list of the force models before starting the propagation)
- The SP3Parser is now capable of reading SP3 files in version "d"
- The new class FacetBodyShapeStatistics allows to compute statistics
- PyramidalField now has a notion of sense of rotation of the field of view (clockwise/counterclockwise)

## Bugs fixes

- Correction of an anomaly happening while considering a Newtonian gravity model which is not centered on the integration body
- Correction of the computation of the reference ellipsoid for a FacetBodyShape
- Correction of the LinkType used in the computation of the g function of the SatToSatMutualVisibilityDetector
- Correction of an anomaly happening while evaluation a ForceModel for a SpacecraftState in ITRF
- Correction of the computation of the normal to a OneAxisEllipsoid

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