The Gödel metric is a specific solution to Einstein's field equations of general relativity. It was proposed by Kurt Gödel in 1949, and it describes a model of the universe with some fascinating and unusual features, including the possibility of time travel due to the presence of closed timelike curves (CTCs).

The metric, in cylindrical coordinates (t, ρ, ϕ, z) where t is time, ρ is radial distance, ϕ is azimuthal angle, and z is height, can be written as:

$$ds^2 = -4a^2(\rho^2 - dt^2) + d\rho^2 + 4a^2\rho^2(d\phi + dt)^2 + dz^2$$

where a is a real constant related to the matter density of the universe and ds^2 is the spacetime interval. This is a solution of Einstein's field equations assuming a negative pressure perfect fluid and a nonzero cosmological constant.

Here are the main features of this solution:

1. **Rotating Universe:** The solution describes a universe that is rotating as a whole. There is no center of rotation. Every galaxy is at rest in its local inertial frame, but the inertial frames themselves are rotating relative to each other. This is a result of the term containing $d\phi$ and dt.

2. **Finitely Observable Universe:** Unlike the case of the Schwarzschild solution, which describes a static, spherically symmetric, vacuum exterior of a star (and contains a horizon if the star is a black hole), the Gödel universe has no traditional horizons. However, due to the non-Euclidean geometry and rotation of the universe, the paths of light are curved. Therefore, an observer looking far enough would eventually see the back of their own head, signifying they're viewing into their past. Thus, the "observable" universe is finite, but not in the traditional sense of a horizon-bound universe.

3. **Closed Timelike Curves (CTCs):** The Gödel metric allows for the existence of closed timelike curves, which are paths in spacetime that, if followed, could bring one back to one's own past. These curves allow for time travel within this universe. These are a direct result of the spacetime's rotation and the specific form of the metric.

4. **Homogeneity and Isotropy:** The Gödel universe is both homogeneous and isotropic. Homogeneity means that every point in the universe looks the same as every other point, while isotropy means that every direction looks the same as every other direction. This is in common with the widely accepted cosmological principle that guides our current standard model of cosmology (the ΛCDM model).

5. **Cosmological Constant:** Gödel's solution assumes a nonzero cosmological constant. This can be associated with the idea of dark energy in current cosmological models.

Although the Gödel universe is not considered a realistic model of our own universe due to the absence of detectable large-scale rotation and issues around causality, it remains an interesting theoretical solution within the context of general relativity. Its most intriguing and unusual feature is arguably the presence of closed timelike curves, challenging our usual understanding of time and causality.