Ridge regression and Tikhonov regularization are two closely related techniques used in regression analysis, particularly in scenarios where the data might be noisy or multicollinearity is present.

**1. Terminology and History:**

**- Ridge Regression:** This term is more commonly used in statistics and machine learning contexts. It was introduced by Hoerl and Kennard in 1970.

**- Tikhonov Regularization:** Named after Andrey Tikhonov, a Russian mathematician who introduced this technique in the context of ill-posed problems in 1943. Tikhonov regularization is a broader term that encompasses both ridge regression and other forms of regularization.

**2. Objective Function:**

**- Ridge Regression:** In ridge regression, the objective function includes the sum of squared errors (like ordinary least squares) plus a penalty term that is proportional to the square of the magnitude of the coefficients (L2 norm).

**- Tikhonov Regularization:** Tikhonov regularization is a generalization of ridge regression. It includes a penalty term on the norm of the coefficients, which can be of any order (not just squared as in ridge regression). So, ridge regression can be seen as a special case of Tikhonov regularization when the penalty term is of second order.

**3. Parameter Tuning:**

**- Ridge Regression:** The regularization strength in ridge regression is typically controlled by a single parameter (often denoted as λ or alpha) that determines the trade-off between fitting the data and preventing overfitting.

**- Tikhonov Regularization:** In Tikhonov regularization, the penalty term's order adds flexibility. Depending on the problem's characteristics, different orders of penalty terms may be more suitable. Thus, it involves tuning not only the regularization strength but also the order of the penalty term.

**4. Solution Approach:**

**- Ridge Regression:** The solution to ridge regression can be found using various optimization techniques such as closed-form solution or iterative methods like gradient descent.

**- Tikhonov Regularization:** Since Tikhonov regularization encompasses a broader set of regularization techniques, the solution approach can vary depending on the penalty term's order and other specific characteristics of the problem.

In summary, ridge regression is a specific case of Tikhonov regularization with a second-order penalty term. Tikhonov regularization provides a more general framework that allows for different penalty terms, potentially offering more flexibility in handling various types of regression problems.