

# Lineer Olmayan Kısmi Diferensiyel Denklemlerin Analitik ve Sayısal Çözüm Metotları

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## ÖZET

Günümüzde ortaya çıkan birçok fiziksel ve matematiksel problem, trigonometrik fonksiyonlar kullanılarak sembolize edilmektedir. Trigonometrik fonksiyonlar ve onların diğer fonksiyonlarla olan ilişkileri yıllardır bilim insanlarının ilgisini çekmiştir. Literatüre sunulan yeni denklemler için farklı yeni analitik metotlar geliştirilmektedir. Söz konusu bazı yeni metotların genel yapısı ve kullanımı trigonometrik fonksiyonların özelliklerine dayanmaktadır. Günlük hayatta karşılaşılan birçok salınımlı ve singüler yapıları problemler, trigonometrik fonksiyonların özellikleri ile açıklanabilmektedir. Bu seminerde literatürde var olan metotlar ile literatüre yeni sunulan Sine-Gordon Açılım Metodu ve genel özellikleri verilecek. Bazı metotlar ile birlikte Sine-Gordon Açılım Metodu kullanılarak lineer olmayan kısmi diferensiyel denklemlerin yeni çözümlerinin nasıl elde edildiği örneklerle açıklanacaktır.

**Anahtar Kelimeler** : Analitik metotlar, Sine-Gordon Açılım Metodu, lineer olmayan kısmi diferensiyel denklemler

## ABSTRACT

Today, many physical and mathematical problems are symbolized by using trigonometric functions. Trigonometric functions and their relations with other functions have attracted scientists' attention for years. Different new analytical methods are developed for the new equations presented in the literature. The general structure and use of some new methods are based on the characteristics of trigonometric functions. Many oscillating and singular problems encountered in daily life can be explained by the characteristics of trigonometric functions. In this seminar, with the methods available in the literature, Sine-Gordon Expansion Method which is recently presented to the literature and its general characteristics will be given. With some methods, how to obtain new solutions of nonlinear partial differential equations will be explained with examples by using Sine-Gordon Expansion Method.

**Key Words**: Analytical methods, Sine-Gordon Expansion Method, nonlinear partial differential equations

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