

INTISARI

Generalisasi klas monoton Barisan-barisan Bilangan dan Fungsi dari klas Monoton Umum

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Pada awalnya deret Fourier diperkenalkan oleh Joseph Fourier (1768-1830) untuk memecahkan model masalah persamaan panas pada suatu lempeng logam. Selanjutnya permasalahan berkembang menjadi permasalahan kemonotonan koefisien deret Fourier, yaitu monoton turun dan konvergen ke nol yang merupakan salah satu syarat cukup agar deret tersebut konvergen. Barisan koefisien deret Fourier sinus dengan sifat monoton turun dan konvergen ke nol tersebut dimasukkan dalam klas yang disebut klas *MS* (*monotone sequences*). Lebih lanjut klas *MS* berkembang menjadi klas monoton umum (*general monotone*) dan sampai akhirnya berkembang menjadi klas barisan bervariasi terbatas supremum (*supremum bounded variation sequences*). Pada tulisan ini akan dibahas generalisasi klas monoton ke dalam klas barisan variasi- p terbatas supremum (*supremum bounded p -variation sequences*). Akan dibahas terlebih dahulu konstruksi klas barisan bervariasi- p terbatas supremum dan klas generalisasi barisan selisih dari konstruksi baru tersebut. Selanjutnya mengingat klas yang diteliti merupakan barisan selisih sangat berkaitan dengan klas barisan bervariasi terbatas. Klas barisan yang bervariasi terbatas dan monoton turun terjamin deret Fouriernya konvergen, maka diperlukan penelitian tentang variasi terbatas dari klas tersebut. Kemudian ditunjukkan bahwa klas variasi terbatas merupakan ruang Banach terhadap norma tertentu dan dibuktikan deret Fourier sinus terjamin konvergen seragam.

Selanjutnya ditunjukkan bahwa klas barisan bervariasi- p terbatas supremum lebih umum dari klas monoton umum dan klas barisan bervariasi terbatas supremum. Mengingat klas barisan bervariasi terbatas supremum telah berkembang menjadi klas barisan ganda bervariasi terbatas supremum (*supremum bounded variation double sequences*), maka dibahas juga konstruksi klas barisan ganda bervariasi- p terbatas supremum (*supremum bounded p -variation double sequences*) dan generalisasi barisan selisih dari konstruksi baru tersebut.

Sebelum klas monoton berkembang menjadi klas fungsi bervariasi terbatas supremum (*supremum bounded variation sequences*), klas monoton umum berkembang menjadi klas fungsi monoton umum (*general monotone functions*). Perkembangan tersebut, dibahas juga konstruksi klas fungsi bervariasi- p terbatas supremum (*supremum bounded p -variation functions*). Kemudian dibicarakan sifat-sifatnya dan dibicarakan juga syarat cukup agar integral sinus konvergen seragam.

Kemudian dibahas beberapa penerapan klas bervariasi- p terbatas supremum. Untuk klas barisan bervariasi- p terbatas supremum diterapkan pada masalah aproksimasi dan untuk klas fungsi variasi- p terbatas supremum diterapkan pada keterintegralan transformasi Fourier di sekitar titik nol.

Kata-kata kunci: monoton umum, bervariasi- p terbatas supremum, ruang Banach, masalah aproksimasi, transformasi Fourier.

ABSTRACT

Generalization Class of Monotone Sequences of Number and Function from class of General Monotone

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At first the Fourier series was introduced by Joseph Fourier (1768-1830) to solve the problem of heat equation on a metal plate. Recently the results of this problem were developed and discussed about the monotonicity of the Fourier series coefficients are decreasing monotone and converges to zero because it is one sufficient condition that the series converges. Sequences of sinus Fourier series coefficients with decreasing monotone properties and converge to zero are called class of *MS* (monotone sequences). Furthermore, class of *MS* is developed into a class of general monotone and finally into a class that is called supremum bounded variation sequences. In this paper, we discuss a generalization of monotone class into a class of supremum bounded p -variation sequences. First, it will be discussed a construction of a class of supremum bounded p -variation sequences and generalization of a difference sequence from that class. Furthermore, considering the class studied is difference sequence which is related to class of bounded variation sequence. Class of sequence o which is bounded variation and decreasing monotone, is guaranteed that Fourier series converge, then it is necessary to study on bonded variation of the class. It is proved that the class of sequence is a Banach space to certain norm, so that the sinus Fourier series is proved converges uniformly.

It can be shown that class of supremum bounded p -variation sequences is more general than class of General Monotone and class of Supremum Bounded Variation Sequences. Since, the class of supremum bounded variation sequences has developed into a class of supremum bounded variation double sequences, we also discuss the construction of a class of supremum bounded p -variation double sequences and generalization of difference sequence from that class.

Class of general monotone has been developed into the class of general monotone functions, before monotone class is developed into class of supremum bounded variation sequences. Now, we also discuss the construction class of supremum bounded p -variation functions, its properties and sufficient condition of that class, so that the sine integral converges uniformly.

Furthermore, we discuss some application of the classes of supremum bounded p -variation. For the class of supremum bounded p -variation sequences, we apply it to the approximation problem and for a class of supremum bounded p -variation functions, we apply it to integrality of Fourier transform near the zero.

Keywords: general monotone, supremum bounded p -variation, Banach space, approximation problem, Fourier transform.