

## PREFACE

The works of the thesis, arranged in three Chapters, concern Perron and Denjoy type integrals of extended real valued functions of a real variable.

In Chapter I, we introduce the proximally Cesàro continuous Perron integral, the PCP-integral. The properties of this integral are studied including the integration by parts theorem. Then we introduce the proximally Cesàro continuous Denjoy integral, the PCD-integral. Among other things, we establish the integration by parts theorem for this integral. Also we show that the Cauchy and Harnack properties are also possessed by the PCD-integral. The Cesàro mean is defined for functions which are PD-integrable ( p. 16 ). The PCP- and PCD-integrals are more general than the CP- and  $GM_1$ -integrals respectively. The contents of this Chapter form the subject matter of our papers :

- (i) The proximal Cesàro-Perron integral, Math. Japonica 30, No. 3 (1985), p. 357-369
- (ii) On the proximal Cesàro-Denjoy integral, Soochow J. Math. 10 (1984), p. 99-110.

Next starting from the special Denjoy integral, we define two scales of Perron type integrals, the  $P_r$ - and  $P_r^*$ -integrals. For  $r \geq 1$ , the  $r$ th integrals in the two scales are incomparable but both of them are proximal extensions of the  $C_r P$ -integral, and more general than the  $A_r$ -integral, an approximate extension of the  $C_r P$ -integral. It is shown that the  $P_r^*$ -integral is included in the  $C_{r+1} P$ -integral but for  $r \geq 1$ , the  $P_r$ - and  $C_{r+1} P$ -integrals are incomparable. Similarly, starting from the general Denjoy integral, we introduce two scales of Denjoy type integrals, the  $D_r$ - and  $D_r^*$ -integrals. For  $r \geq 1$ , the  $r$ th integrals in the two scales are incomparable and are proximal extensions of the  $GM_r$ -integral. It is shown that the  $D_r$ -integral ( resp.  $D_r^*$ -integral ) is more general than the  $P_r$ -integral ( resp.  $P_r^*$ -integral ). The  $D_r^*$ -integral is included in the  $GM_{r+1}$ -integral but for  $r \geq 1$ , the  $D_r$ - and  $GM_{r+1}$ -integrals are incomparable. Among other things, we give the integration by parts theorem for each of the  $P_r$ -,  $P_r^*$ -,  $D_r$ - and  $D_r^*$ -integrals. The  $P_r$ - and  $D_r$ -integrals are studied in Chapter II and the  $P_r^*$ - and  $D_r^*$ -integrals are studied in Chapter III.

Each generalisation of the integrals considered in the thesis is substantiated by giving appropriate example.

In fine, I wish to express my warmest thanks to the authors of the books and papers referred to in pages 168-183 whose expositions have helped me to complete the work. Also I am grateful to the University of North Bengal for awarding me a U.G.C. Research Fellowship.

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