1046-12-898   **V Ravi Srinivasan*** (`varadhu_ravi@ou.edu`), 601, Elm avenue, PHSC 423, Department of Mathematics, University of Oklahoma, Norman, OK 73019-0315. *On Certain Towers of Extensions by Antiderivatives.* Preliminary report.

Let $\mathbf{F}$ be a characteristic zero differential field with an algebraically closed field of constants, $\mathbf{E} \supset \mathbf{F}$ be a no new constant extension by antiderivatives of $\mathbf{F}$ and let $\mathfrak{y}_1, \cdots, \mathfrak{y}_n$ be antiderivatives of $\mathbf{E}$. The antiderivatives $\mathfrak{y}_1, \cdots, \mathfrak{y}_n$ of $\mathbf{E}$ are called J-I-E antiderivatives if $\mathfrak{y}_i' \in \mathbf{E}$ satisfies certain conditions. We will discuss a new proof for the Kolchin-Ostrowski theorem and generalize this theorem for a tower of extensions by J-I-E antiderivatives and use this generalized version of the theorem to classify the finitely differentially generated subfields of this tower. In the process, we will show that the J-I-E antiderivatives are algebraically independent over the ground differential field. An example of a J-I-E tower is extensions by iterated logarithms. We will discuss the normality of extensions by iterated logarithms and produce an algorithm to compute the finitely differentially generated subfields of these extensions. For further information please visit http://math.ou.edu/∼ vsrinivasan/Thesis-I.pdf (Received September 12, 2008)