$GL(2,\mathbb{R})$ **GEOMETRIES AND ODEs**

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We will discuss the description of classes of contact equivalent ordinary differential equations of order $n \geq 5$ in terms of Cartan bundle B with the base being the space of solutions and with the structure group, which is the semidirect product of $GL(2,\mathbb{R})$ with $\mathbb{R}^n$. In case of ODEs of order 5 we give necessary and sufficient conditions for contact equivalent classes of ODEs to define a Cartan connection on B with values in the Lie algebra of $GL(2,\mathbb{R})$ semidirect product of $\mathbb{R}^5$. Relations between this geometry and recently developed SO(3) geometry in dimension 5 will also be discussed.