# On the development of analytical mechanics

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Today, when solving problems in mechanics, one does not apply Newton's laws in their original form, rather differential equations and mathematical relations are used. How did the basic equations of analytical mechanics evolve from Newton's laws? In particular how did one arrive from the second law:

*The change of motion is ever proportional to the motive force impressed; and is made in the direction of the right line in which that force is impressed*

to the differential equation:
$$m\ddot{\mathbf{r}} = \mathbf{F}$$

that is essential in our calculations? I sketch the history of the development of analytical mechanics.