The relation between covariant and functional Hamilton equations

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It is well-known that a decomposition of space-time into space + time allows us to pass from the covariant Euler-Lagrange equations to the functional Euler-Lagrange equations. By means of the functional Legendre transformation, these in turn give rise to the functional Hamilton equations. But it is also possible to use the covariant Legendre transformation to get covariant Hamilton equations (also known as the DeDonder-Weyl equations). In our talk, we propose to complete the quadrangle by presenting a procedure for passing directly from the covariant to the functional Hamilton equations. Examples of this passage in field theory and continuum mechanics will be discussed.