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We study approximation classes for adaptive time-stepping finite element methods for time-dependent Partial Differential Equations (PDEs). We measure the approximation error in $L_2([0, T] \times \Omega)$ and consider the approximation with discontinuous finite elements in time and continuous finite elements in space, of any degree. As a byproduct we define Besov spaces for vector-valued functions on an interval and derive some embeddings, as well as Jackson- and Whitney-type estimates.

Joint work with Marcelo Actis (Universidad del Litoral, Santa Fe, Argentina) and Pedro Morin (Universidad del Litoral, Santa Fe, Argentina).