space-time domain SQ:= \Omega \times (0,T) \subset \{mathble \{R}\}^{n+1}\\$, where the control is assumed to be in the energy space \{\frac{5H}{0.0}\}^{n+1}\}, \(\frac{1}{0.0}\)\\^{n+1}\}\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	doc_1		doc_2		decision	ic
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	abstract	space-time domain $Q:=\operatorname{Omega} \times (0,T) \times (0,T) \times (n+1)$, where the control is assumed to be in the energy space $H_{0;,0}^{1,1}(Q)^{*}$, rather than in $L^2(Q)$ which is more common. While the latter ensures a unique state in the Sobolev space $H^{1,1}_{0;0}$, this does not define a solution isomorphism. Hence we use an appropriate state space X such that the wave operator becomes an isomorphism from X onto $H_{0;,0}^{1,1}(Q)^{*}$. Using space-time finite element spaces of piecewise linear continuous basis functions on completely unstructured but shape regular simplicial meshes, we derive a priori estimates for the error $\ u\ + \ $		time domain Q := â,, × (0, T) âŠ, R n+1, where the control is assumed to be in the energy space [H1, 10;, 0 (Q)] â^—, rather than in L 2 (Q) which is more common. While the latter ensures a unique state in the Sobolev space H1, 10;0, (Q), this does not dei¬ne a solution isomorphism. Hence we use an appropriate state space X such that the wave operator becomes an isomorphism from X onto [H1, 10;, 0 (Q)] â^—. Using space-time i¬nite element spaces of piecewise linear continuous basis functions on completely unstructured but shape regular simplicial meshes, we derive a priori estimates for the error (cid:107) (cid:101) u (cid:37)h â^' u (cid:107) L 2 (Q) between the computed space-time i¬nite element solution (cid:101) u (cid:37)h and the target function u with respect to the regularization parameter (cid:37), and the space-time i¬nite element mesh-size h, depending on the regularization parameter (cid:37) for a given space-time i¬nite element mesh size h, or to determine the required mesh size h when (cid:37) is a given constant representing the costs of the control. The theoretical results will be supported by numerical examples with targets of dii¬€erent regularities, including discontinuous targets. Furthermore, an adaptive space-time i¬nite element scheme is proposed and numerically	DUPLICATE	3
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