Mohammad Ghomi (ghomi@math.sc.edu), Department of Mathematics, University of South Carolina, Columbia, SC 29208, and Ralph Howard* (howard@math.sc.edu), Department of Mathematics, University of South Carolina, Columbia, SC 29208. Unfoldings of Space Curves.

Let $\mathcal{U}(L)$ be the set of Lipschitz maps $c: \mathbb{R} \rightarrow \mathbb{R}^n$ so that $\|c'(t)\| = 1$ almost everywhere and with $c(t + L) = c(t)$. This is the collection of unit speed parameterizations of closed rectifiable curves in $\mathbb{R}^n$ of length $L$. For any $c \in \mathcal{U}(L)$, let $\text{UnFold}(L)$ be the set of curves $\gamma \in \mathcal{U}(L)$ so that $\|\gamma(s) - \gamma(t)\| \geq \|c(t) - c(s)\|$ for all $s, t$. Elements of $\text{Unfold}(c)$ are unfoldings of $c$. We investigate compactness, regularity, and continuity of functionals on $\text{Unfold}(c)$. Some sample results are (1) If $0 < \alpha \leq 1$ and $c$ is $C^{1,\alpha}$, then any unfolding of $c$ is also $C^{1,\alpha}$, (2) Functionals of the form $\mathcal{F}[\gamma] = \int_0^L \int_0^L f(s, t, \gamma(s), \gamma(t), \gamma'(s), \gamma'(t)) \, ds \, dt$ are continuous on $\text{Unfold}(c)$, provided $f$ is continuous, (3) Every $c \in \mathcal{U}(L)$ has a planar convex unfolding. The last result can be used to show that circles are minimizers for a large class of Möbius invariant knot energies. (Received January 20, 2001)