Corrections to

Kogan, I.A., and Olver, P.J., The invariant variational bicomplex, *Contemp. Math.* **285** (2001), 131–144.

In (30), the second formula is missing a summation over i:

$$d_{\mathcal{V}}\, I^{\alpha} = \sum_{\beta=1}^{q} \mathcal{A}^{\alpha}_{\beta}(\vartheta^{\beta}), \qquad\qquad d_{\mathcal{V}}\, \varpi^{j} = \sum_{i=1}^{p}\sum_{\beta=1}^{q} \mathcal{B}^{j}_{i,\beta}(\vartheta^{\beta}) \wedge \varpi^{i}, \tag{30}$$

A sign error in the third displayed equation on page 142 propagated. The corrected version of the affected text follows:

Further,

$$d_{\mathcal{V}}\, \varpi^1 = -\,\kappa^1\, \vartheta \wedge \varpi^1 + \frac{1}{\kappa^1 - \kappa^2} \big(\mathcal{D}_1 \mathcal{D}_2 - Z_2 \mathcal{D}_1 \big) \vartheta \wedge \varpi^2,$$
$$d_{\mathcal{V}}\, \varpi^2 = \frac{1}{\kappa^2 - \kappa^1} \big(\mathcal{D}_2 \mathcal{D}_1 - Z_1 \mathcal{D}_2 \big) \vartheta \wedge \varpi^1 - \kappa^2\, \vartheta \wedge \varpi^2,$$

which yields the Hamiltonian operator complex

$$\begin{aligned} \mathcal{B}^1_1 &= -\,\kappa^1, \\ \mathcal{B}^2_2 &= -\,\kappa^2, \end{aligned} \qquad \mathcal{B}^1_2 = \frac{1}{\kappa^1 - \kappa^2} \big(\mathcal{D}_1 \mathcal{D}_2 - Z_2 \mathcal{D}_1 \big) = \frac{1}{\kappa^1 - \kappa^2} \big(\mathcal{D}_2 \mathcal{D}_1 - Z_1 \mathcal{D}_2 \big) = -\,\mathcal{B}^2_1.$$

Therefore, according to our fundamental formula (9.24), the Euler-Lagrange equation for a Euclidean-invariant variational problem is

$$\begin{aligned} 0 = \mathbf{E}(L) = {} & \big[\, (\mathcal{D}_1 + Z_1)^2 - (\mathcal{D}_2 + Z_2) \cdot Z_2 + (\kappa^1)^2 \,\big] \mathcal{E}_1(\widetilde{L}) \\ & + \big[\, (\mathcal{D}_2 + Z_2)^2 - (\mathcal{D}_1 + Z_1) \cdot Z_1 + (\kappa^2)^2 \,\big] \mathcal{E}_2(\widetilde{L}) + \kappa^1\, \mathcal{H}^1_1(\widetilde{L}) + \kappa^2\, \mathcal{H}^2_2(\widetilde{L}) \\ & + \big[\, (\mathcal{D}_2 + Z_2)(\mathcal{D}_1 + Z_1) + (\mathcal{D}_1 + Z_1) \cdot Z_2 \,\big] \cdot \left(\frac{\mathcal{H}^1_2(\widetilde{L}) - \mathcal{H}^2_1(\widetilde{L})}{\kappa^1 - \kappa^2} \right). \end{aligned}$$

As before, $\mathcal{E}_\alpha(\widetilde{L})$ are the invariant Eulerians with respect to the principal curvatures κ^α, while $\mathcal{H}^i_j(\widetilde{L})$ are the invariant Hamiltonians. In particular, if $\widetilde{L}(\kappa^1, \kappa^2)$ does not depend on any differentiated invariants, the Euler-Lagrange equation reduces to

$$\big[\, (\mathcal{D}_1^\dagger)^2 + \mathcal{D}_2^\dagger \cdot Z_2 + (\kappa^1)^2 \,\big] \frac{\partial \widetilde{L}}{\partial \kappa^1} + \big[\, (\mathcal{D}_2^\dagger)^2 + \mathcal{D}_1^\dagger \cdot Z_1 + (\kappa^2)^2 \,\big] \frac{\partial \widetilde{L}}{\partial \kappa^2} - (\kappa^1 + \kappa^2) \widetilde{L} = 0.$$

For example, the problem of minimizing surface area has invariant Lagrangian $\widetilde{L} = 1$, and so has the well-known Euler-Lagrange equation $\mathbf{E}(L) = -\,(\kappa^1 + \kappa^2) = -2H = 0$, and hence minimal surfaces have vanishing mean curvature. The mean curvature Lagrangian $\widetilde{L} = H = \frac{1}{2}(\kappa^1 + \kappa^2)$ has Euler-Lagrange equation

$$\tfrac{1}{2} \big[\, (\kappa^1)^2 + (\kappa^2)^2 - (\kappa^1 + \kappa^2)^2 \,\big] = -\,\kappa^1\, \kappa^2 = -K = 0.$$