The symplectic Laplacian

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Abstract

We construct a Laplacian depending only of a symplectic form and a connection.

1 A 2-form of a connection

We consider the 2-form depending only of a (symplectic) connection over the tangent bundle and with values in the differential operators of 1 order:

\[ \Lambda(X, Y)Z = X\nabla_Y Z - Y\nabla_X Z - \nabla_{[X,Y]}Z \]

2 The symplectic Laplacian

We suppose that we have a symplectic form \( \omega \), then the symplectic Laplacian is:

\[ \Delta_\omega = \omega \Lambda = \sum_i e_i \nabla_{f_i} - f_i \nabla_{e_i} - \nabla_{[e_i, f_i]} \]

with \((e_i, f_i)\) a symplectic basis.

3 Bibliography