
PyNosh Documentation

Release 0.2.2

Nico Schlömer

October 14, 2015

1	<code>pynosh.modevaluator_nls</code>	3
2	Indices and tables	5
	Python Module Index	7

Contents:

pynosh.model evaluator_nls

Provide information around the nonlinear Schrödinger equations.

```
class pynosh.model evaluator_nls.NlsModelEvaluator (mesh,          V=None,          A=None,
                                                    preconditioner_type='none',
                                                    num_amg_cycles=inf)
```

Bases: `object`

Nonlinear Schrödinger model evaluator class. Incorporates

- Nonlinear Schrödinger: $g = 1.0, V = 0.0, A = 0.0$.
- Gross–Pitaevskii: $g = 1.0, V$ given, $A = 0.0$.
- Ginzburg–Landau: $g = 1.0, V = -1.0$, and some magnetic potential A .

compute_f (x, mu, g)
Computes the nonlinear Schrödinger residual

$$GP(\psi) = K\psi + (V + g|\psi|^2)\psi$$

energy (psi)
Compute the Gibbs free energy. Not really a norm, but a good measure for our purposes here.

get_jacobian (x, mu, g)
Returns a LinearOperator object that defines the matrix-vector multiplication scheme for the Jacobian operator as in

$$A\phi + B\phi^*$$

with

$$\begin{aligned} A &= K + I(V + g \cdot 2|\psi|^2), \\ B &= g \cdot \text{diag}(\psi^2). \end{aligned}$$

get_jacobian_blocks (x, mu, g)
Returns

$$\begin{aligned} A &= K + I(V + g \cdot 2|\psi|^2), \\ B &= g \cdot \text{diag}(\psi^2). \end{aligned}$$

get_preconditioner (x, mu, g)
Return the preconditioner.

get_preconditioner_inverse (x, mu, g)
Use AMG to invert M approximately.

inner_product ($phi0, phi1$)
The natural inner product of the problem.

Indices and tables

- `genindex`
- `modindex`
- `search`

p

`pynosh.modevaluator_nls`, 3

C

`compute_f()` (`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 3

E

`energy()` (`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 3

G

`get_jacobian()` (`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 3

`get_jacobian_blocks()` (`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 3

`get_preconditioner()` (`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 3

`get_preconditioner_inverse()`
(`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 3

I

`inner_product()` (`pynosh.modeevaluator_nls.NlsModelEvaluator`
method), 4

N

`NlsModelEvaluator` (class in
`pynosh.modeevaluator_nls`), 3

P

`pynosh.modeevaluator_nls` (module), 3