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"""Conjugate gradient descent algorithm implementation."""

**Classes:**

***ConjGrad***

"""A class which implements conjugate gradient descent as a torch module.

This implementation of conjugate gradient descent works as a standard torch module, with the functions forward and get\_metadata overridden. It is used as an optimization block within a Recon object.

Args:

rhs (Tensor): The residual vector b in some conjugate gradient descent algorithms.

Aop\_fun (func): A function performing the A matrix operation.

max\_iter (int): Maximum number of times to run conjugate gradient descent.

l2lam (float): The L2 lambda, or regularization parameter (must be positive).

eps (float): Determines how small the residuals must be before termination.

verbose (bool): If true, prints extra information to the console.

Attributes:

rhs (Tensor): The residual vector~~,~~ b in some conjugate gradient descent algorithms.

Aop\_fun (func): A function performing the A matrix operation.

max\_iter (int): The maximum number of times to run conjugate gradient descent.

l2lam (float): The L2 lambda regularization parameter.

eps (float): Minimum residuals for termination.

verbose (bool): Whether or not to print extra info to the console.

"""

**Functions:**

***ConjGrad.forward***

"""Performs one forward pass through the conjugate gradient descent algorithm.

Args:

x (Tensor): The input to the gradient algorithm.

Returns:

The forward pass on x.

"""

***ConjGrad.get\_metadata***

"""Accesses metadata for the algorithm.

Returns:

A dict containing metadata.

"""

***conjgrad***

"""A function that implements the conjugate gradient descent algorithm.

Args:

x (Tensor): The initial input to the algorithm.

b (Tensor): The residual vector

Aop\_fun (func): A function performing the A matrix operation.

max\_iter (int): Maximum number of times to run conjugate gradient descent.

l2lam (float): The L2 lambda, or regularization parameter (must be positive).

eps (float): Determines how small the residuals must be before termination…

verbose (bool): If true, prints extra information to the console.

Returns:

A tuple containing the updated vector x and the number of iterations performed.

"""