Backpropamine: meta-learning with neuromodulated Hebbian plasticity

- **Differentiable plasticity**: meta-learning with Hebbian **plastic** connections
  - Meta-train both the baseline **weight** and **plasticity** of each connection to support efficient learning in any episode

- In nature, plasticity is under real-time control through **neuromodulators**
  - The brain can decide **when** and **where** to be plastic

- **Backpropamine** = **Differentiable plasticity + neuromodulation**
  - Make the **rate** of plasticity a real-time **output** of the network
  - During each episode, the network effectively learns by self-modification

- Results:
  - Solves tasks that non-modulated networks cannot
  - Improves LSTM performance on PTB language modeling task

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