Assignment-2

Git: <https://github.com/iamankan/MA421G.git>

Branch: assignments

File: A2P4

P4:

Code:

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| import numpy as np  from numpy import exp, log  # 1  def sigma\_1(t: int)-> tuple:  return exp(t)/(1+exp(t)), 'sigma(t)'  # 2  def sigma\_2(t: int)-> tuple:  return 1/(1+exp(-t)), 'sigma(t)'  # 3  def log\_sigma\_3(t: int)-> tuple:  return log(1+exp(-t)), '-ln(sigma(t))'  # 4  def log\_sigma\_4(t: int)-> tuple:  if t <= 0:  return -t + log(1+exp(t)), '-ln(sigma(t))'  if t > 0:  return log(1+exp(-t)), '-ln(sigma(t))'  tset = [0,10,-10,100,-100,500,-500,1000,-1000]  for t in tset:  print(f't: {t}, {sigma\_1(t=t)}')  print(f't: {t}, {sigma\_2(t=t)}')  print(f't: {t}, {log\_sigma\_3(t=t)}')  print(f't: {t}, {log\_sigma\_4(t=t)}') |

Output:

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| t: 0, (0.5, 'sigma(t) = exp(t)/(1+exp(t))')  t: 0, (0.5, 'sigma(t) = 1/(1+exp(-t))')  t: 0, (0.6931471805599453, '-ln(sigma(t)) = log(1+exp(-t))')  t: 0, (0.6931471805599453, '-ln(sigma\_4(t)) = -t + log(1+exp(t))')  t: 10, (0.9999546021312976, 'sigma(t) = exp(t)/(1+exp(t))')  t: 10, (0.9999546021312976, 'sigma(t) = 1/(1+exp(-t))')  t: 10, (4.5398899216870535e-05, '-ln(sigma(t)) = log(1+exp(-t))')  t: 10, (4.5398899216870535e-05, '-ln(sigma\_4(t)) = log(1+exp(-t))')  t: -10, (4.5397868702434395e-05, 'sigma(t) = exp(t)/(1+exp(t))')  t: -10, (4.5397868702434395e-05, 'sigma(t) = 1/(1+exp(-t))')  t: -10, (10.000045398899218, '-ln(sigma(t)) = log(1+exp(-t))')  t: -10, (10.000045398899218, '-ln(sigma\_4(t)) = -t + log(1+exp(t))')  t: 100, (1.0, 'sigma(t) = exp(t)/(1+exp(t))')  t: 100, (1.0, 'sigma(t) = 1/(1+exp(-t))')  t: 100, (0.0, '-ln(sigma(t)) = log(1+exp(-t))')  t: 100, (0.0, '-ln(sigma\_4(t)) = log(1+exp(-t))')  t: -100, (3.720075976020836e-44, 'sigma(t) = exp(t)/(1+exp(t))')  t: -100, (3.7200759760208356e-44, 'sigma(t) = 1/(1+exp(-t))')  t: -100, (100.0, '-ln(sigma(t)) = log(1+exp(-t))')  t: -100, (100.0, '-ln(sigma\_4(t)) = -t + log(1+exp(t))')  t: 500, (1.0, 'sigma(t) = exp(t)/(1+exp(t))')  t: 500, (1.0, 'sigma(t) = 1/(1+exp(-t))')  t: 500, (0.0, '-ln(sigma(t)) = log(1+exp(-t))')  t: 500, (0.0, '-ln(sigma\_4(t)) = log(1+exp(-t))')  t: -500, (7.124576406741286e-218, 'sigma(t) = exp(t)/(1+exp(t))')  t: -500, (7.124576406741285e-218, 'sigma(t) = 1/(1+exp(-t))')  t: -500, (500.0, '-ln(sigma(t)) = log(1+exp(-t))')  t: -500, (500.0, '-ln(sigma\_4(t)) = -t + log(1+exp(t))')  t: 1000, (nan, 'sigma(t) = exp(t)/(1+exp(t))')  t: 1000, (1.0, 'sigma(t) = 1/(1+exp(-t))')  t: 1000, (0.0, '-ln(sigma(t)) = log(1+exp(-t))')  t: 1000, (0.0, '-ln(sigma\_4(t)) = log(1+exp(-t))')  t: -1000, (0.0, 'sigma(t) = exp(t)/(1+exp(t))')  t: -1000, (0.0, 'sigma(t) = 1/(1+exp(-t))')  t: -1000, (inf, '-ln(sigma(t)) = log(1+exp(-t))')  t: -1000, (1000.0, '-ln(sigma\_4(t)) = -t + log(1+exp(t))') |

Warning:

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| /var/folders/br/p4vyyhqs7kg9vnb50rbzwr4r0000gp/T/ipykernel\_99817/728629907.py:3: RuntimeWarning: overflow encountered in exp  return exp(t)/(1+exp(t)), 'sigma(t) = exp(t)/(1+exp(t))'  /var/folders/br/p4vyyhqs7kg9vnb50rbzwr4r0000gp/T/ipykernel\_99817/728629907.py:3: RuntimeWarning: invalid value encountered in double\_scalars  return exp(t)/(1+exp(t)), 'sigma(t) = exp(t)/(1+exp(t))'  /var/folders/br/p4vyyhqs7kg9vnb50rbzwr4r0000gp/T/ipykernel\_99817/728629907.py:7: RuntimeWarning: overflow encountered in exp  return 1/(1+exp(-t)), 'sigma(t) = 1/(1+exp(-t))'  /var/folders/br/p4vyyhqs7kg9vnb50rbzwr4r0000gp/T/ipykernel\_99817/728629907.py:11: RuntimeWarning: overflow encountered in exp  return log(1+exp(-t)), '-ln(sigma(t)) = log(1+exp(-t))' |