Testing root-function with 100 randomly generated initial guesses $-100 \leq x_0 \leq 100$ for $f(x_0, x_1) = \begin{pmatrix} x_0 + \frac{1}{2}(x_0 - x_1)^3 - 1 \\ \frac{1}{2}(x_1 - x_0)^3 + x_1 \end{pmatrix}$

resulted in:

method \ cs	default	rmt	rmt_int	bsc
broyden1	✓ 84 %	✓ 100 %	✓ 95 %	DNC 100 %
broyden2	✓ 99 %	✓ 99 %	✓ 100 %	DNC 100 %
anderson	✓ 100 %	✓ 78 %	✓ 100 %	DNC 100 %
diagbroyden	✓ 48 %	✓ 75 %	✓ 100 %	DNC 100 %
exciting-mixing	DNC 100 %	✗ 100 %	DNC 100 %	✗ 100 %
krylov	✓ 63 % / ✗ 25 %	✓ 73 % / ✗ 22 %	✓ 100 %	✓ 100 %
linearmixing	DNC 100 %	✗ 100 %	DNC 100 %	✗ 100 %

It is shown ones label (converged, did not converge or Error) that occured the most and its posterior probability after this experiment (in %).

With $x_0 = (10, -10)$ these Errors occured:

ValueError: Jacobian inversion yielded zero vector. (nonlin.py, line 587)

ZeroDivisonError: float division by zero (linesearch.py, line 1344)

OverflowError