Actual code

Actual Execution time for 1000 runs: 8137.166992 us

Actual O/P: q0: 0.122323; q1: 0.272198, q2: 0.242435; q3: 0.922759

Optimization:

1. Eliminating calculation of redundant expressions - OPT\_CSE

Actual Execution time for 1000 runs: 8268.958008 us

Optimized Execution time for 1000 runs: 6820.583984 us

Actual O/P: q0: -0.884585; q1: -0.006928, q2: 0.132634; q3: 0.446263

Optimized O/P: q0: -0.884585; q1: -0.006928, q2: 0.132634; q3: 0.446263

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %

2. Variant of Inverse square root

Actual Execution time for 1000 runs: 8180.124023 us

Optimized Execution time for 1000 runs: 6761.041016 us

Actual O/P: q0: 0.068524; q1: -0.319391, q2: -0.276539; q3: -0.902328

Optimized O/P: q0: 0.068524; q1: -0.319391, q2: -0.276539; q3: -0.902328

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %

3. Algebraic reduction

Actual Execution time for 1000 runs: 8288.167969 us

Optimized Execution time for 1000 runs: 6721.666016 us

Actual O/P: q0: 0.983985; q1: 0.083736, q2: -0.027228; q3: -0.144292

Optimized O/P: q0: 0.983985; q1: 0.083736, q2: -0.027228; q3: -0.144292

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %

4. Optimization flags

O1

Actual Execution time for 1000 runs: 4202.375000 us

Optimized Execution time for 1000 runs: 4161.791992 us

Actual O/P: q0: -0.781817; q1: -0.363409, q2: -0.491960; q3: -0.110777

Optimized O/P: q0: -0.781817; q1: -0.363409, q2: -0.491960; q3: -0.110777

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %

O2

Actual Execution time for 1000 runs: 4158.333008 us

Optimized Execution time for 1000 runs: 4088.791992 us

Actual O/P: q0: 0.247216; q1: -0.292902, q2: -0.140184; q3: -0.911187

Optimized O/P: q0: 0.247216; q1: -0.292902, q2: -0.140184; q3: -0.911187

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %

O3

Actual Execution time for 1000 runs: 4293.666992 us

Optimized Execution time for 1000 runs: 4064.166016 us

Actual O/P: q0: -0.456107; q1: 0.649673, q2: 0.459352; q3: 0.394197

Optimized O/P: q0: -0.456107; q1: 0.649673, q2: 0.459352; q3: 0.394197

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %

5.float comparison to integer comparison

Actual Execution time for 1000 runs: 4237.333008 us

Optimized Execution time for 1000 runs: 4054.833008 us

Actual O/P: q0: 0.451542; q1: 0.855507, q2: 0.251046; q3: 0.013827

Optimized O/P: q0: 0.451542; q1: 0.855507, q2: 0.251046; q3: 0.013827

Error percentage: q0: 0.000000 %, q1: 0.000000 %, q2: 0.000000 %, q3: 0.000000 %