

Root Squaring for Root Finding

ABSTRACT

We use root squaring to approximate the root radius of polynomials.

CCS CONCEPTS

• Computing methodologies → Hybrid symbolic-numeric methods.

KEYWORDS

symbolic-numeric computing, root finding, polynomial algorithms, computer algebra

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1 INTRODUCTION

2 RELATED WORKS

3 BACKGROUND

4 MOTIVATING EXAMPLE

5 ALGORITHM DESIGN

Algorithm 1 circ_roots_rational_form(p,q,l)

```

r, s = circ_sq_root(p,q)
t, u = circ_neg(r,s)
if l == 1 then
    return [(r,s),(t,u)]
else if l != 0 then
    left = circ_roots_rational_form(r,s,l-1)
    right = circ_roots_rational_form(t,u,l-1)
    return left ∪ right
else
    return [(p,q)]
end if

```

6 THEORETICAL ANALYSIS

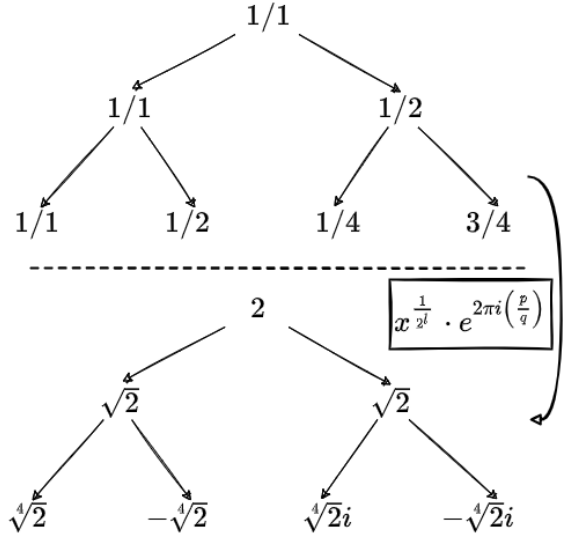


Figure 1: The steps of circ_roots_rational_form(p,q,l) in Alg.1.

Algorithm 2 circ_sq_root(p,q)

```

if p%q == 0 then
    return 1,1
else
    return p, 2·q
end if

```

Algorithm 3 circ_neg(p,q)

```

if p%q == 0 then
    return 1,2
else
    return 2·p+q, 2·q
end if

```

7 EXPERIMENTAL RESULTS

8 CONCLUSION

REFERENCES

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