



Question: another challenge replacement of subexpression with conduction

Posted: nm 5826 Product: Maple 2021

programming patmatch transformation subsindets + Manage Tags

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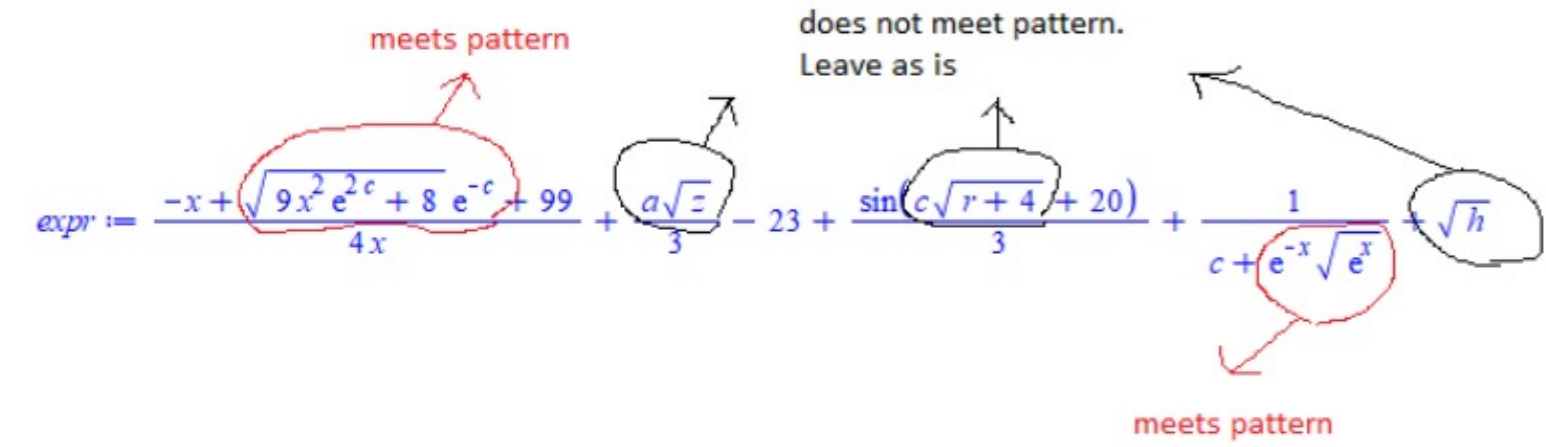
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I am learning how to subsindets to change subexpressions in a large expression which meets certain patterns. I need to capture subexpression which has the specific pattern exp(anything)*anything*sqrt(anything) and then apply some transformation to the whole subscription found.

First will give an example of input and expected output, then my attempt, and then show how this can be done using pattern matching

Given

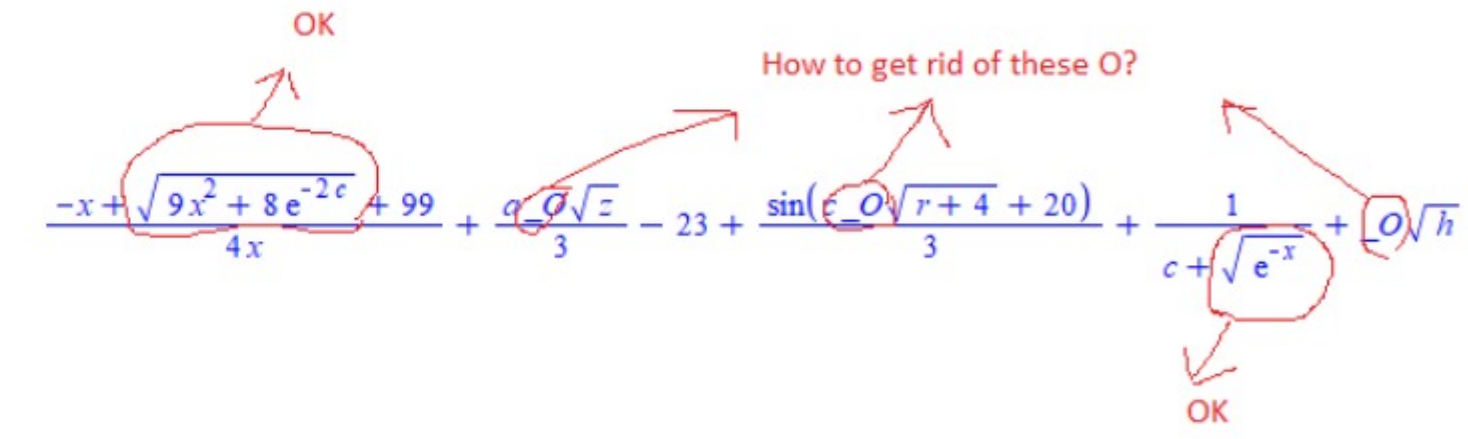
```
expr := (-x + sqrt(9*x^2*exp(2*c) + 8)*exp(-c) + 99)/(4*x) + a*sqrt(z)/3 - 23 + sin(c*sqrt(r + 4) + 20)/3 + 1/(c + exp(-x)*sqrt(exp(x))) + sqrt(h)
```



I am modifying Carl's solution given in How-To-Change-Subexpression-With-Some but can't get it to work. It is close, but can't figure how to remove a big _O that shows in there. Here is the modification I made to Carl's code

```
restart:
expr:=
  (-x + sqrt(9*x^2*exp(2*c) + 8)*exp(-c)+99)/(4*x)
  + (a*sqrt(z)-99+sin(c*sqrt(r+4)+20))/3
  + 10
  + 1/(c+exp(-x)*sqrt(exp(x)))
  + sqrt(h)
;
sq:= anything^[-1/2, 1/2]:
subsindets(
  subsindets(expr, sq, e-> _O*e),
  And(`*`, satisfies(e-> membertype(sq, {op}(e)) and has(e,exp)  )),
  e-> eval( simplify(sqrt(e^2)),_O=1)
);
```

I changed the satisfies part to tell it to only detect the pattern if the term multiplying the sqrt() (if anything there) has an exp in it. The output is



I must admit, I thing these things hard to do in Maple and it requires lots of gymnastics and high skill in subtle things in Maple which few people have and there are little examples or material to help one learn how to do these things.

Using pattern matching in Mathematica, is much simpler. One just needs to write the pattern they want, give it a name, and apply the transformation on the named pattern as follows

```
expr /. patternName : (Exp[any3_]*any_.)*Power[Any_, Rational[1 | -1, 2]] -> Sqrt[patternName^2]
```

I wish I could do the same in Maple using patmatch. How to do the above using subsindent? What modification do I need to make to Carl's code to make it work? Maple 2021.1