

[11.6] Use `solve()` as multiple-equation solver

The HP48/49 series of calculators have a useful feature called the 'multiple equation solver'. This is *not* the same as solving simultaneous equations. Instead, the equations have some variables in common, but not every equation has every variable. For example, consider the equations for Ohm's law and electrical power:

$$\begin{aligned}V &= I * R \\ P &= I * V\end{aligned}$$

In this case, there are four variables, but by specifying any two, it is possible to solve for the remaining two variables. You can use the `solve()` function to simulate the HP48 multiple equation solving capability, like this:

```
solve(v=i*r and p=i*v,{r})|v=4.2 and p=10
```

In this example I know $v = 4.2V$ and $p = 10$ watts, and I want to find the resistance r . I can't find the resistance directly from either equation; I need both equations to find it. In this case, $r = 1.764$ ohms.

It is nearly as easy to find both unknown variables at once:

```
solve(v=i*r and p=i*v,{r,i})|v=4.2 and p=10
```

which returns

```
r = 1.746 and i = 2.381
```