Formula

```
> restart
>
> Rx = (2 n - 1)R / (n - 1)^2
```

$$Rx = \frac{(2\,n-1)\,R}{(n-1)^2} \tag{1.1}$$

```
> eq = (2 n - 1)R / n^2
```

$$eq = \frac{(2\,n-1)\,R}{n^2} \tag{1.2}$$

2x2

```
> restart
>
> Req := eq = Vr1 / Is :
> r1 := Is = (Vr1 - Vc1)/R11 + (Vr1 - Vc2)/R12 :
> r2 := 0 = (Vr2 - Vc1)/R21 + (Vr2 - Vc2)/R22 :
>
> c2 := 0 = (Vc2 - Vr1)/R12 + (Vc2 - Vr2)/R22 :
>
> Vc1 := 0 :
> R11 := R : R12 := R :
> R21 := R : R22 := R :
>
> L := solve({Req, r1, r2, c2}, [eq, Vr1, Vr2, Vc2])[1][1]
```

$$L := eq = \frac{3\,R}{4} \tag{2.1}$$

```
> Req1 := eq = R11·Rx / (R11 + Rx) :
> solve({L, Req1}, [Rx, eq])[1][1]
```

$$Rx = 3\,R \tag{2.2}$$

3x3

```
> restart
```

```
>
> Req := eq = Vr1/Is :
> r1 := Is = (Vr1 - Vc1)/R11 + (Vr1 - Vc2)/R12 + (Vr1 - Vc3)/R13 :
> r2 := 0 = (Vr2 - Vc1)/R21 + (Vr2 - Vc2)/R22 + (Vr2 - Vc3)/R23 :
> r3 := 0 = (Vr3 - Vc1)/R31 + (Vr3 - Vc2)/R32 + (Vr3 - Vc3)/R33 :
>
> c2 := 0 = (Vc2 - Vr1)/R12 + (Vc2 - Vr2)/R22 + (Vc2 - Vr3)/R32 :
> c3 := 0 = (Vc3 - Vr1)/R13 + (Vc3 - Vr2)/R23 + (Vc3 - Vr3)/R33 :
>
> Vc1 := 0 :
> R11 := R : R12 := R : R13 := R :
> R21 := R : R22 := R : R23 := R :
> R31 := R : R32 := R : R33 := R :
> L := solve( {Req, r1, r2, r3, c2, c3}, [eq, Vr1, Vr2, Vr3, Vc2, Vc3]) [1][1]
```

$$L := eq = \frac{5\,R}{9} \tag{3.1}$$

```
> Req1 := eq = (R11·Rx)/(R11 + Rx) :
> solve( {L, Req1}, [Rx, eq]) [1][1]
```

$$Rx = \frac{5\,R}{4} \tag{3.2}$$

4x4

```
> restart
>
> Req := eq = Vr1/Is :
> r1 := Is = (Vr1 - Vc1)/R11 + (Vr1 - Vc2)/R12 + (Vr1 - Vc3)/R13 + (Vr1 - Vc4)/R14 :
> r2 := 0 = (Vr2 - Vc1)/R21 + (Vr2 - Vc2)/R22 + (Vr2 - Vc3)/R23 + (Vr2 - Vc4)/R24 :
> r3 := 0 = (Vr3 - Vc1)/R31 + (Vr3 - Vc2)/R32 + (Vr3 - Vc3)/R33 + (Vr3 - Vc4)/R34 :
> r4 := 0 = (Vr4 - Vc1)/R41 + (Vr4 - Vc2)/R42 + (Vr4 - Vc3)/R43 + (Vr4 - Vc4)/R44 :
>
```

```
> c2 := 0 = (Vc2 - Vr1)/R12 + (Vc2 - Vr2)/R22 + (Vc2 - Vr3)/R32 + (Vc2 - Vr4)/R42 :
> c3 := 0 = (Vc3 - Vr1)/R13 + (Vc3 - Vr2)/R23 + (Vc3 - Vr3)/R33 + (Vc3 - Vr4)/R43 :
> c4 := 0 = (Vc4 - Vr1)/R14 + (Vc4 - Vr2)/R24 + (Vc4 - Vr3)/R34 + (Vc4 - Vr4)/R44 :
>
> Vc1 := 0 :
> R11 := R : R12 := R : R13 := R : R14 := R :
> R21 := R : R22 := R : R23 := R : R24 := R :
> R31 := R : R32 := R : R33 := R : R34 := R :
> R41 := R : R42 := R : R43 := R : R44 := R :
> L := solve({Req, r1, r2, r3, r4, c2, c3, c4}, [eq, Vr1, Vr2, Vr3, Vr4, Vc2, Vc3, Vc4])[1][1]
```

$$L := eq = \frac{7\,R}{16} \tag{4.1}$$

```
> Req1 := eq = (R11·Rx)/(R11 + Rx) :
> solve({L, Req1}, [Rx, eq])[1][1]
```

$$Rx = \frac{7\,R}{9} \tag{4.2}$$

5x5

```
> restart
>
> Req := eq = Vr1/Is :
> r1 := Is = (Vr1 - Vc1)/R11 + (Vr1 - Vc2)/R12 + (Vr1 - Vc3)/R13 + (Vr1 - Vc4)/R14 + (Vr1 - Vc5)/R15 :
> r2 := 0 = (Vr2 - Vc1)/R21 + (Vr2 - Vc2)/R22 + (Vr2 - Vc3)/R23 + (Vr2 - Vc4)/R24 + (Vr2 - Vc5)/R25 :
> r3 := 0 = (Vr3 - Vc1)/R31 + (Vr3 - Vc2)/R32 + (Vr3 - Vc3)/R33 + (Vr3 - Vc4)/R34 + (Vr3 - Vc5)/R35 :
> r4 := 0 = (Vr4 - Vc1)/R41 + (Vr4 - Vc2)/R42 + (Vr4 - Vc3)/R43 + (Vr4 - Vc4)/R44 + (Vr4 - Vc5)/R45 :
> r5 := 0 = (Vr5 - Vc1)/R51 + (Vr5 - Vc2)/R52 + (Vr5 - Vc3)/R53 + (Vr5 - Vc4)/R54 + (Vr5 - Vc5)/R55 :
>
> c2 := 0 = (Vc2 - Vr1)/R12 + (Vc2 - Vr2)/R22 + (Vc2 - Vr3)/R32 + (Vc2 - Vr4)/R42 + (Vc2 - Vr5)/R52 :
> c3 := 0 = (Vc3 - Vr1)/R13 + (Vc3 - Vr2)/R23 + (Vc3 - Vr3)/R33 + (Vc3 - Vr4)/R43 + (Vc3 - Vr5)/R53 :
```

```
> c4 := 0 = (Vc4 - Vr1)/R14 + (Vc4 - Vr2)/R24 + (Vc4 - Vr3)/R34 + (Vc4 - Vr4)/R44 + (Vc4 - Vr5)/R54 :
> c5 := 0 = (Vc5 - Vr1)/R15 + (Vc5 - Vr2)/R25 + (Vc5 - Vr3)/R35 + (Vc5 - Vr4)/R45 + (Vc5 - Vr5)/R55 :
> Vc1 := 0 :
> R11 := R : R12 := R : R13 := R : R14 := R : R15 := R :
> R21 := R : R22 := R : R23 := R : R24 := R : R25 := R :
> R31 := R : R32 := R : R33 := R : R34 := R : R35 := R :
> R41 := R : R42 := R : R43 := R : R44 := R : R45 := R :
> R51 := R : R52 := R : R53 := R : R54 := R : R55 := R :
> L := solve({Req, r1, r2, r3, r4, r5, c2, c3, c4, c5}, [eq, Vr1, Vr2, Vr3, Vr4, Vr5, Vc2, Vc3, Vc4, Vc5])[1][1]
```

$$L := eq = \frac{9\,R}{25} \tag{5.1}$$

```
> Req1 := eq = (R11·Rx)/(R11 + Rx) :
> solve({L, Req1}, [Rx, eq])[1][1]
```

$$Rx = \frac{9\,R}{16} \tag{5.2}$$

8x8

```
> restart
>
> Req := eq = Vr1/Is :
> r1 := Is = (Vr1 - Vc1)/R11 + (Vr1 - Vc2)/R12 + (Vr1 - Vc3)/R13 + (Vr1 - Vc4)/R14 + (Vr1 - Vc5)/R15
      + (Vr1 - Vc6)/R16 + (Vr1 - Vc7)/R17 + (Vr1 - Vc8)/R18 :
> r2 := 0 = (Vr2 - Vc1)/R21 + (Vr2 - Vc2)/R22 + (Vr2 - Vc3)/R23 + (Vr2 - Vc4)/R24 + (Vr2 - Vc5)/R25
      + (Vr2 - Vc6)/R26 + (Vr2 - Vc7)/R27 + (Vr2 - Vc8)/R28 :
> r3 := 0 = (Vr3 - Vc1)/R31 + (Vr3 - Vc2)/R32 + (Vr3 - Vc3)/R33 + (Vr3 - Vc4)/R34 + (Vr3 - Vc5)/R35
      + (Vr3 - Vc6)/R36 + (Vr3 - Vc7)/R37 + (Vr3 - Vc8)/R38 :
> r4 := 0 = (Vr4 - Vc1)/R41 + (Vr4 - Vc2)/R42 + (Vr4 - Vc3)/R43 + (Vr4 - Vc4)/R44 + (Vr4 - Vc5)/R45
      + (Vr4 - Vc6)/R46 + (Vr4 - Vc7)/R47 + (Vr4 - Vc8)/R48 :
```

$$r5 := 0 = \frac{Vr5 - Vc1}{R51} + \frac{Vr5 - Vc2}{R52} + \frac{Vr5 - Vc3}{R53} + \frac{Vr5 - Vc4}{R54} + \frac{Vr5 - Vc5}{R55} + \frac{Vr5 - Vc6}{R56} + \frac{Vr5 - Vc7}{R57} + \frac{Vr5 - Vc8}{R58} :$$

$$r6 := 0 = \frac{Vr6 - Vc1}{R61} + \frac{Vr6 - Vc2}{R62} + \frac{Vr6 - Vc3}{R63} + \frac{Vr6 - Vc4}{R64} + \frac{Vr6 - Vc5}{R65} + \frac{Vr6 - Vc6}{R66} + \frac{Vr6 - Vc7}{R67} + \frac{Vr6 - Vc8}{R68} :$$

$$r7 := 0 = \frac{Vr7 - Vc1}{R71} + \frac{Vr7 - Vc2}{R72} + \frac{Vr7 - Vc3}{R73} + \frac{Vr7 - Vc4}{R74} + \frac{Vr7 - Vc5}{R75} + \frac{Vr7 - Vc6}{R76} + \frac{Vr7 - Vc7}{R77} + \frac{Vr7 - Vc8}{R78} :$$

$$r8 := 0 = \frac{Vr8 - Vc1}{R81} + \frac{Vr8 - Vc2}{R82} + \frac{Vr8 - Vc3}{R83} + \frac{Vr8 - Vc4}{R84} + \frac{Vr8 - Vc5}{R85} + \frac{Vr8 - Vc6}{R86} + \frac{Vr8 - Vc7}{R87} + \frac{Vr8 - Vc8}{R88} :$$

>

$$c2 := 0 = \frac{Vc2 - Vr1}{R12} + \frac{Vc2 - Vr2}{R22} + \frac{Vc2 - Vr3}{R32} + \frac{Vc2 - Vr4}{R42} + \frac{Vc2 - Vr5}{R52} + \frac{Vc2 - Vr6}{R62} + \frac{Vc2 - Vr7}{R72} + \frac{Vc2 - Vr8}{R82} :$$

$$c3 := 0 = \frac{Vc3 - Vr1}{R13} + \frac{Vc3 - Vr2}{R23} + \frac{Vc3 - Vr3}{R33} + \frac{Vc3 - Vr4}{R43} + \frac{Vc3 - Vr5}{R53} + \frac{Vc3 - Vr6}{R63} + \frac{Vc3 - Vr7}{R73} + \frac{Vc3 - Vr8}{R83} :$$

$$c4 := 0 = \frac{Vc4 - Vr1}{R14} + \frac{Vc4 - Vr2}{R24} + \frac{Vc4 - Vr3}{R34} + \frac{Vc4 - Vr4}{R44} + \frac{Vc4 - Vr5}{R54} + \frac{Vc4 - Vr6}{R64} + \frac{Vc4 - Vr7}{R74} + \frac{Vc4 - Vr8}{R84} :$$

$$c5 := 0 = \frac{Vc5 - Vr1}{R15} + \frac{Vc5 - Vr2}{R25} + \frac{Vc5 - Vr3}{R35} + \frac{Vc5 - Vr4}{R45} + \frac{Vc5 - Vr5}{R55} + \frac{Vc5 - Vr6}{R65} + \frac{Vc5 - Vr7}{R75} + \frac{Vc5 - Vr8}{R85} :$$

$$c6 := 0 = \frac{Vc6 - Vr1}{R16} + \frac{Vc6 - Vr2}{R26} + \frac{Vc6 - Vr3}{R36} + \frac{Vc6 - Vr4}{R46} + \frac{Vc6 - Vr5}{R56} + \frac{Vc6 - Vr6}{R66} + \frac{Vc6 - Vr7}{R76} + \frac{Vc6 - Vr8}{R86} :$$

$$c7 := 0 = \frac{Vc7 - Vr1}{R17} + \frac{Vc7 - Vr2}{R27} + \frac{Vc7 - Vr3}{R37} + \frac{Vc7 - Vr4}{R47} + \frac{Vc7 - Vr5}{R57} + \frac{Vc7 - Vr6}{R67} + \frac{Vc7 - Vr7}{R77} + \frac{Vc7 - Vr8}{R87} :$$

$$c8 := 0 = \frac{Vc8 - Vr1}{R18} + \frac{Vc8 - Vr2}{R28} + \frac{Vc8 - Vr3}{R38} + \frac{Vc8 - Vr4}{R48} + \frac{Vc8 - Vr5}{R58}$$

$$+\frac{Vc8-Vr6}{R68}+\frac{Vc8-Vr7}{R78}+\frac{Vc8-Vr8}{R88}:$$

```
>
> Vc1 := 0 :
> R12 := R : R13 := R : R14 := R : R15 := R : R16 := R : R17 := R : R18 := R :
> R21 := R : R22 := R : R23 := R : R24 := R : R25 := R : R26 := R : R27 := R : R28 := R :
> R31 := R : R32 := R : R33 := R : R34 := R : R35 := R : R36 := R : R37 := R : R38 := R :
> R41 := R : R42 := R : R43 := R : R44 := R : R45 := R : R46 := R : R47 := R : R48 := R :
> R51 := R : R52 := R : R53 := R : R54 := R : R55 := R : R56 := R : R57 := R : R58 := R :
> R61 := R : R62 := R : R63 := R : R64 := R : R65 := R : R66 := R : R67 := R : R68 := R :
> R71 := R : R72 := R : R73 := R : R74 := R : R75 := R : R76 := R : R77 := R : R78 := R :
> R81 := R : R82 := R : R83 := R : R84 := R : R85 := R : R86 := R : R87 := R : R88 := R :
> L := solve( {Req, r1, r2, r3, r4, r5, r6, r7, r8, c2, c3, c4, c5, c6, c7, c8}, [eq, Vr1, Vr2, Vr3, Vr4,
      Vr5, Vr6, Vr7, Vr8, Vc2, Vc3, Vc4, Vc5, Vc6, Vc7, Vc8]) [1][1]
```

$$L := eq = \frac{15\ R11\ R}{15\ R + 49\ R11} \tag{6.1}$$

```
> Req1 := eq = (R11·Rx)/(R11 + Rx) :
> solve( {L, Req1}, [Rx, eq]) [1][1]
```

$$Rx = \frac{15\ R}{49} \tag{6.2}$$