



## APPENDIX **A**

# Determining Approximate Roots using Maxima

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In the circle-circle intersection equations below:

- $d$  represents the inter-access point distance in feet
- $Obg$  represents the percentage of overlap desired for 802.11bg
- $Oa$  represents the percentage of overlap desired for 802.11a
- $R$  represents the cell radius in feet

Note that zero overlap occurs when the distance between the centers of the two circles is equal to twice the radius ( $d = 2R$ ). This relationship becomes invalid if  $d$  is allowed to exceed  $2R$ , as an area of intersection would be impossible to calculate. This is why the *find\_root* function is limited to the closed interval from  $d/2$  to  $d$ .

```
wxMaxima 0.7.3a http://wxmaxima.sourceforge.net
Maxima 5.13.0 http://maxima.sourceforge.net
Using Lisp GNU Common Lisp (GCL) GCL 2.6.8 (aka GCL)
Distributed under the GNU Public License. See the file COPYING.
Dedicated to the memory of William Schelter.
(%i1) d:45.9;
(%o1) 45.9
(%i2) Obg:0.10;
(%o2) 0.1
(%i3) Oa:0.15;
(%o3) 0.15
(%i4) find_root(Obg*pi*R^2=2*R^2*acos(d/(2*R))-(1/2*d*(sqrt(4*R^2-d^2))),R,d/2,d);
(%o4) 28.49573663945017
(%i5) find_root(Oa*pi*R^2=2*R^2*acos(d/(2*R))-(1/2*d*(sqrt(4*R^2-d^2))),R,d/2,d);
(%o5) 30.87736860938116
```



### Note

Maxima is not produced, marketed, sold, or supported by Cisco. Maxima is a publically available computer algebra system (CAS) that has been released under the GNU Public License. Further details regarding Maxima, its capabilities, and its use (including downloads for various operating systems) can be found at the following URL <http://maxima.sourceforge.net>.

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