Subject: solve cubic polynomial for dummies?
Posted by mga1 on Wed, 23 Apr 2014 21:26:50 GMT
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Hi all

I have a cubic polynomial:

'-1.9441*x^3+2.8777*x^2-2.2023*x+1'

and a series of y values:

Y = [0.556076778, 0.459954297, 0.404784134, 0.540789788, 0.7493244, 0.814803237, 1, 0.296016879, 0.434675619, 0.612691897]

How would I solve this for x in each case?

Cheers,

Mat

Subject: Re: solve cubic polynomial for dummies?
Posted by wlandsman on Wed, 23 Apr 2014 23:39:58 GMT
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You could use the exact formula for a cubic (e.g. http://idlastro.gsfc.nasa.gov/ftp/contrib/freudenreich/cuber oot.pro) but it is probably easier to use the general root finder FZ_ROOTS in a little program like cube solve.pro below

coeff = [-1.94410 , 2.87770 , -2.02300 , 1.00000]
Y = [0.556076778, 0.459954297, 0.404784134, 0.540789788, 0.7493244, 0.814803237, 1, 0.296016879, 0.434675619, 0.612691897]

```
pro cubesolve,coeff,y
foreach val,y do begin
  c = coeff
  c[0] = coeff[0]-val
  roots = fz_roots(c,/double)
  print,roots
  endforeach
  return
  end
```

There are 3 roots to a cubic but likely you are only interested in the real root.

On Wednesday, April 23, 2014 5:26:50 PM UTC-4, mg...@students.waikato.ac.nz wrote:
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>
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> How would I solve this for x in each case?
>
>
>
> Cheers,
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>
>
> Mat

Subject: Re: solve cubic polynomial for dummies?
Posted by mga1 on Thu, 24 Apr 2014 20:30:06 GMT
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Fantastic thanks. Final code used posted below. Ended up using cuberoot but fz_roots worked also:

```
pro cubesolve,coeff,y

coeff = [1.00000, -2.02300, 2.87770, -1.94410]

Y = [0, 0.95]

N_values=n_elements(y)


   for i=0, N_values-1  do begin
```

```
    val=y[i]
;   c = coeff
;   c[0] = coeff[0]-val
;   roots = fz_roots(c,/double)
;   print,roots

    x = CUBEROOT([1.00000-val, -2.02300, 2.87770, -1.94410])

    print, x

    endfor

end
```