

---

Subject: Re: Calculate the included angle between two vectors  
Posted by [Pierre V.](#) on Thu, 09 Apr 2009 15:43:00 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

On Apr 9, 7:14 am, "dux...@gmail.com" <dux...@gmail.com> wrote:  
> Is there a function which can calculate the included angle between  
> two three-dimensional vectors?  
>  
> jdu

Here's a simple solution. Assume v1 and V2 are each three-element vectors of any magnitude. Compute the angle in degrees as follows:

```
angle = acos( transpose(v1)#v2 / sqrt(total(v1^2)) / sqrt(total  
(v2^2)) ) * 180./!pi
```

Good luck.

---

---

Subject: Re: Calculate the included angle between two vectors  
Posted by [Chris\[6\]](#) on Thu, 09 Apr 2009 17:41:36 GMT

[View Forum Message](#) <> [Reply to Message](#)

---

On Apr 9, 5:43 am, Pierre <pierre.villene...@gmail.com> wrote:  
> On Apr 9, 7:14 am, "dux...@gmail.com" <dux...@gmail.com> wrote:  
>  
>> Is there a function which can calculate the included angle between  
>> two three-dimensional vectors?  
>  
>> jdu  
>  
> Here's a simple solution. Assume v1 and V2 are each three-element  
> vectors of any magnitude. Compute the angle in degrees as follows:  
>  
> angle = acos( transpose(v1)#v2 / sqrt(total(v1^2)) / sqrt(total  
> (v2^2)) ) \* 180./!pi  
>  
> Good luck.

There is an issue with this method due to the fact that acos cannot distinguish between positive and negative angles ( $\cos(-\theta) = \cos(\theta)$ ).

I have found this website to be very useful for coding geometry type problems like this one:

<http://local.wasp.uwa.edu.au/~pbourke/geometry/>

chris

---

---

Subject: Re: Calculate the included angle between two vectors  
Posted by [duxiyu@gmail.com](mailto:duxiyu@gmail.com) on Fri, 10 Apr 2009 09:15:01 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

Thanks all.

On Apr 10, 1:41 am, Chris <beaum...@ifa.hawaii.edu> wrote:  
> On Apr 9, 5:43 am, Pierre <pierre.villene...@gmail.com> wrote:  
>  
>> On Apr 9, 7:14 am, "dux...@gmail.com" <dux...@gmail.com> wrote:  
>  
>>> Is there a function which can calculate the included angle between  
>>> two three-dimensional vectors?  
>  
>>> jdu  
>  
>> Here's a simple solution. Assume v1 and V2 are each three-element  
>> vectors of any magnitude. Compute the angle in degrees as follows:  
>  
>> angle = acos( transpose(v1)#v2 / sqrt(total(v1^2)) / sqrt(total  
>> (v2^2)) ) \* 180./!pi  
>  
>> Good luck.  
>  
> There is an issue with this method due to the fact that acos cannot  
> distinguish between positive and negative angles (cos(-theta) = cos  
> (theta)).  
> I have found this website to be very useful for coding geometry type  
> problems like this one:<http://local.wasp.uwa.edu.au/~pbourke/geometry/>  
>  
> chris

---

Subject: Re: Calculate the included angle between two vectors  
Posted by [jameskuyper](mailto:jameskuyper) on Fri, 10 Apr 2009 09:47:54 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

Chris wrote:  
> On Apr 9, 5:43 am, Pierre <pierre.villene...@gmail.com> wrote:  
>> On Apr 9, 7:14 am, "dux...@gmail.com" <dux...@gmail.com> wrote:  
>>  
>>> Is there a function which can calculate the included angle between  
>>> two three-dimensional vectors?  
>>> jdu  
>> Here's a simple solution. Assume v1 and V2 are each three-element  
>> vectors of any magnitude. Compute the angle in degrees as follows:  
>>

```
>> angle = acos( transpose(v1)#v2 / sqrt(total(v1^2)) / sqrt(total
>> (v2^2)) ) * 180./!pi
>>
>> Good luck.
>
> There is an issue with this method due to the fact that acos cannot
> distinguish between positive and negative angles (cos(-theta) = cos
> (theta)).
```

The angle between two vectors is by definition positive; the question asked does not provide enough information to assign a sign to the angle. "Enough information" could be, for instance, a third vector which defines (via the right-hand rule) which direction of rotation counts as a clockwise rotation, and which one is counterclockwise.

---