Re: Simple matrix proof

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From: joccis (*not.adomain_at_foo.com*)
Date: 09/27/04

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Thank you all for your imput. I figured out how to do it somewhat properly through MX=0 <=> X=0 by considering that you can always choose k so that there is at least one A^(k−1) which is not zero. However, the series approach was a complete and nice surprise after a day of worh with the problem :)

joccis

On 26 Sep 2004, Alain Verghote wrote:
>On 26 Sep 2004, joccis wrote:
>>Let A be a (n x n) matrix, such that A^k=0 for some k>1.
>>Show that I−A is non−singular.
>>
>>Proof
>>Let M=I−A, then
>> A^(k−1)M = A^(k−1)I − A^(k−1)A^k
>> A^(k−1)M = A^(k−1)−A^k
>> A^(k−1)M = A^(k−1)
>><=> M=I, hence M is non−singular.
>>
>>Am I missing something trivial here? If M=I, then A=0, and A^k=0 on every k and the statement turns out quite uninteresting.
>>
>>regards
>>joccis
>
>Dear joccis,
>
>We choose k = n and A^n=0 .
> Proof I/(I−A) exists .Because A^n=0;I/(I−A)=I+A+A^2+..A^(n−2)+A^(n−1)
> Look you don't need bigger power than n−1.
> If (I−A)^(−1) is defined then I−A is non−singular.
> Hope It helps.
>
>Alain.