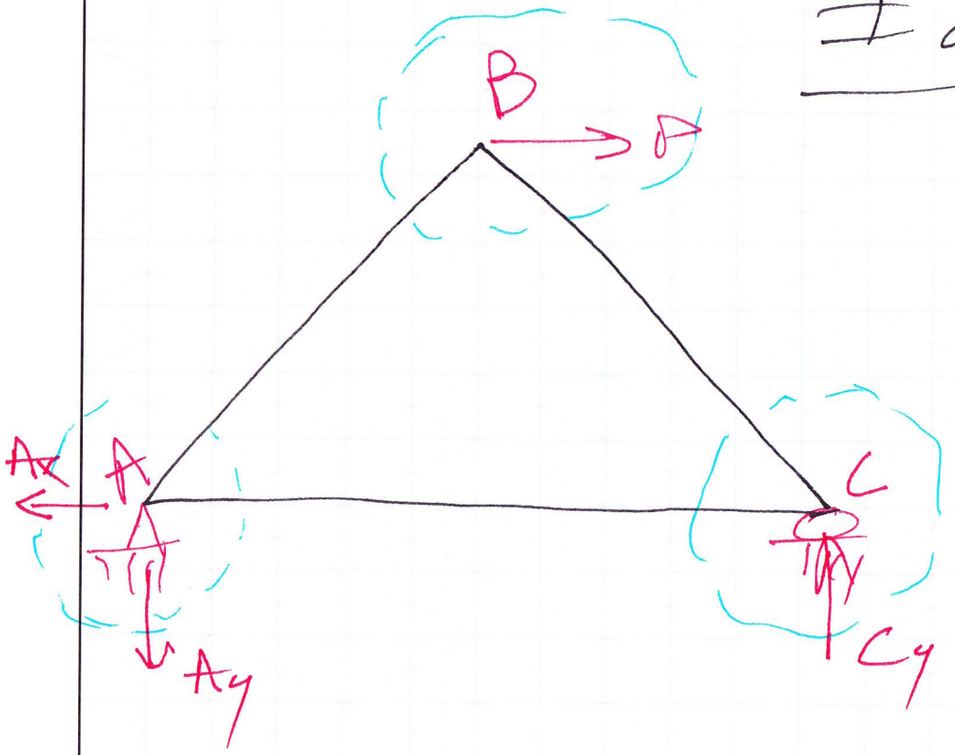
Idealized Truss



Knowns

Σ # of Joints

Unknowns

Σ # of Reaction Forces + Σ # of members M

$\Sigma J > R + M$ Unstable

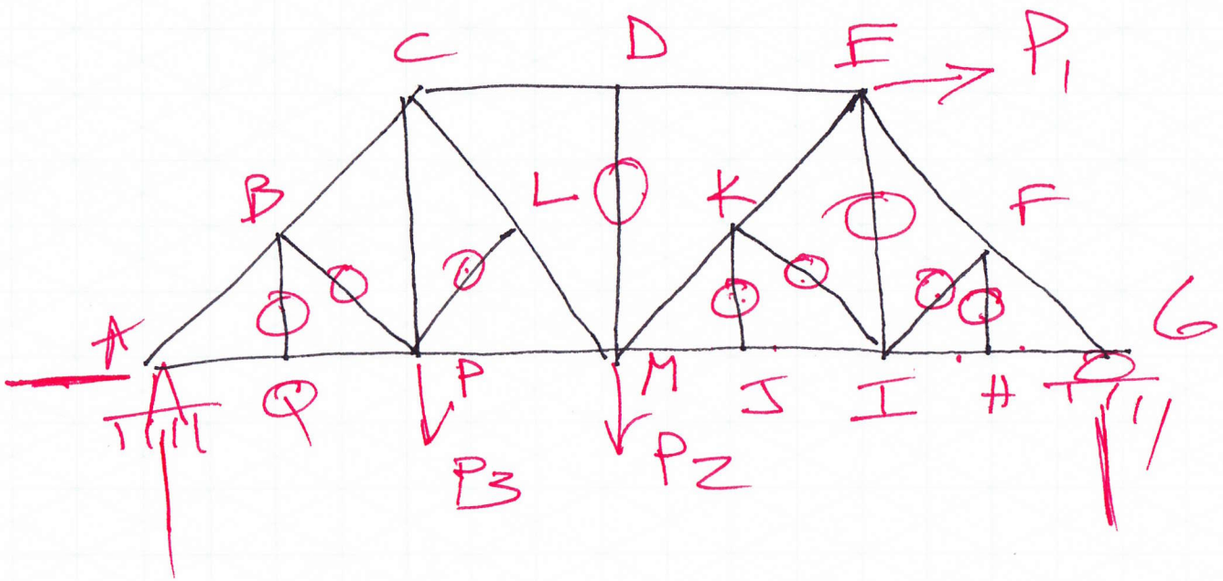
$\Rightarrow \Sigma J = R + M$ May be determinate
May be stable.

$\Sigma J < R + M$ Indeterminate

The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.

Zero Force Members

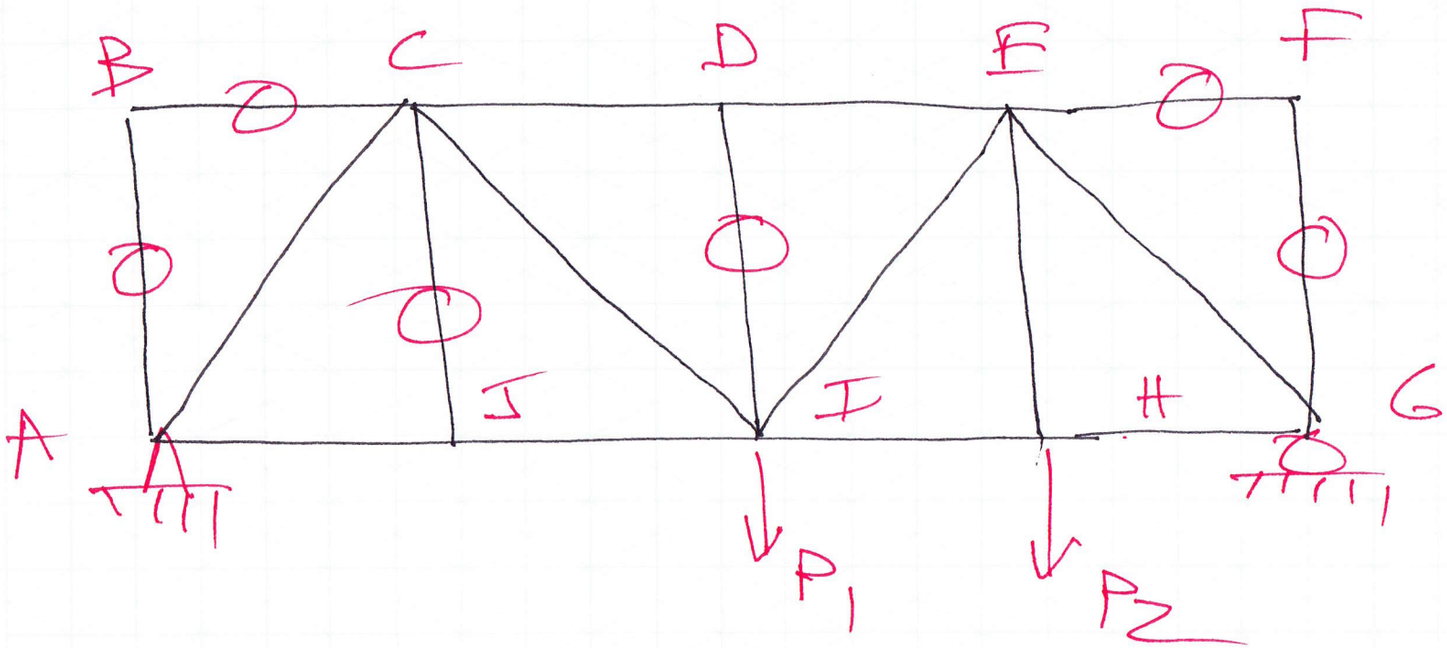
1. Three members at a joint — No load at the joint — 2 of the members ar colinear. Third member is zero



The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.

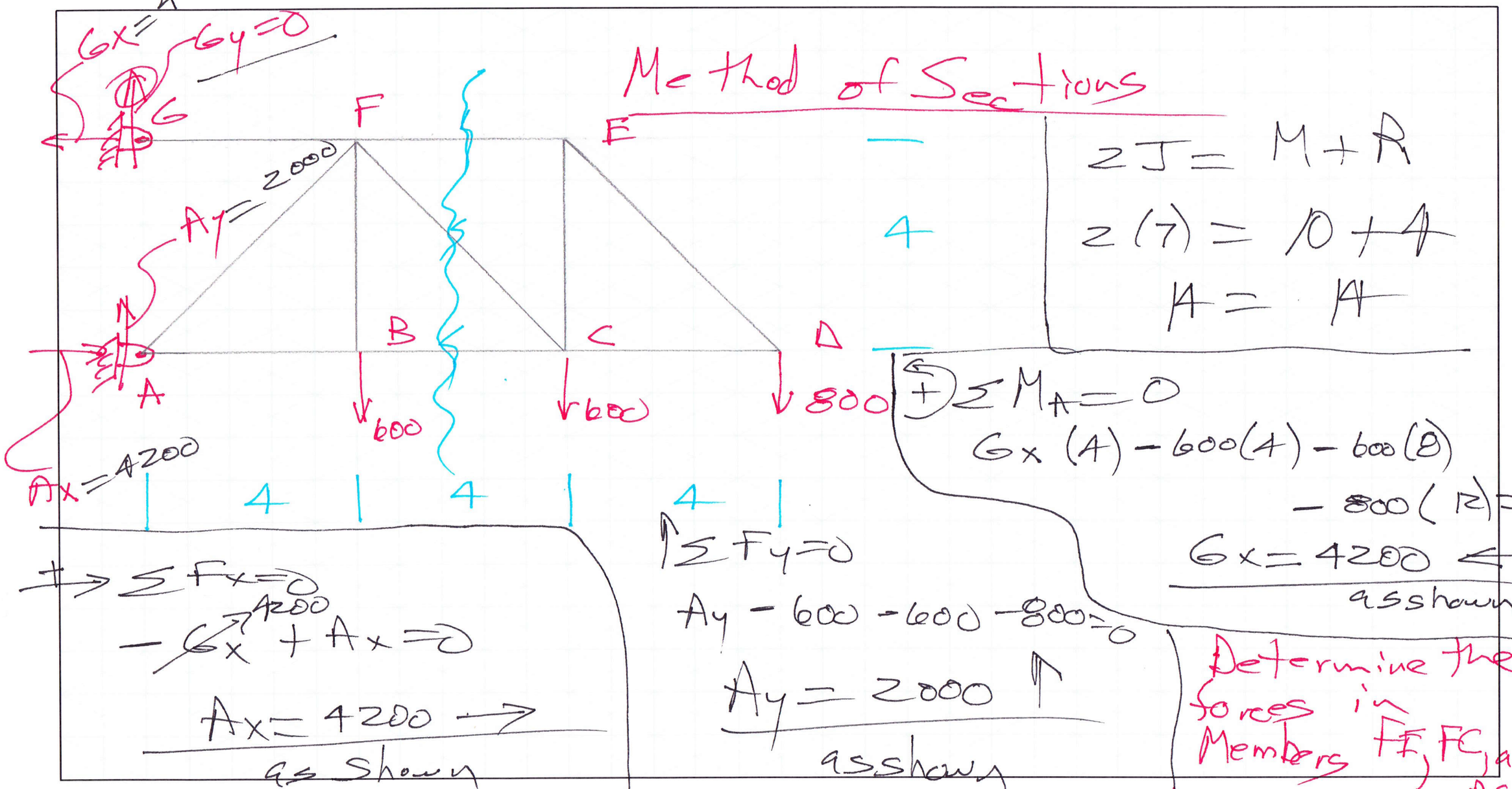
Zero Force Members

2. Two members — No load applied at Joint — both members are zero.



The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.

Method of Sections



$\Sigma J = M + R$

$2(7) = 10 + 4$

$14 = 14$

$\circlearrowleft + \Sigma M_A = 0$

$G_x(4) - 600(4) - 600(8) - 800(12) = 0$

$G_x = 4200 \leftarrow$ as shown

$\rightarrow + \Sigma F_x = 0$

$-G_x + A_x = 0$

$A_x = 4200 \rightarrow$ as shown

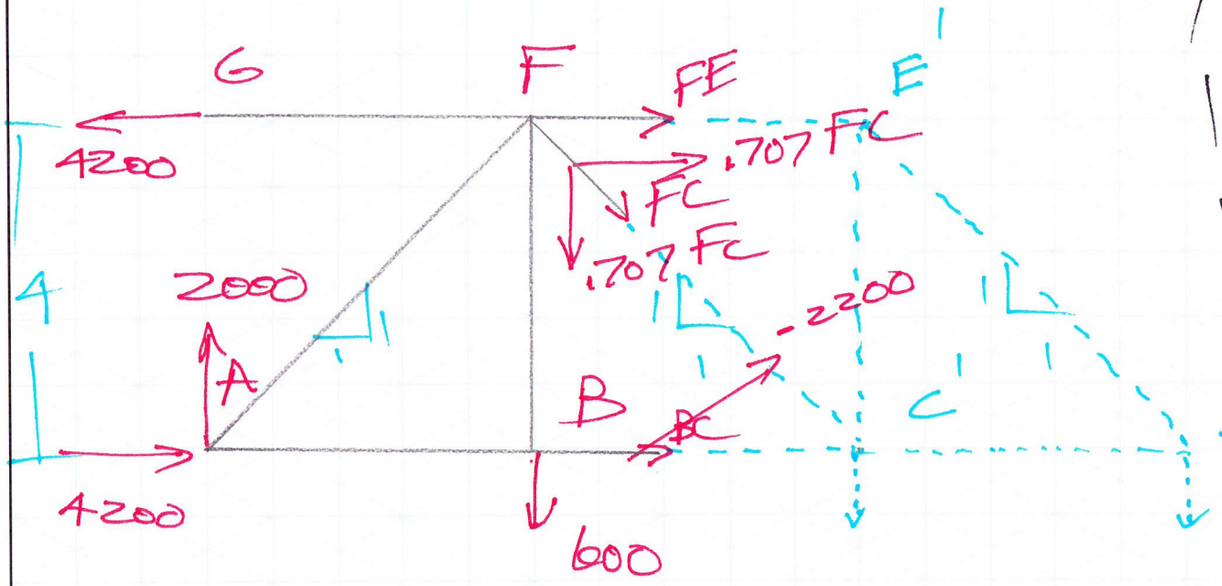
$\uparrow \Sigma F_y = 0$

$A_y - 600 - 600 - 800 = 0$

$A_y = 2000 \uparrow$ as shown

Determine the forces in Members FE, FC, and BC

The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.



$\circlearrowleft + \sum M_F = 0$

$BC(4) + 4200(4) - 2000(4) = 0$

$BC = \frac{-2200}{C}$

$\circlearrowleft + \sum M_C = 0$

$-FE(4) + 600(4) - 2000(8) + 4200(4) =$

$FE = +800$ T

$\rightarrow + \sum F_x = 0$

$-4200 + 4200 + BC + FE + .707 FC = 0$

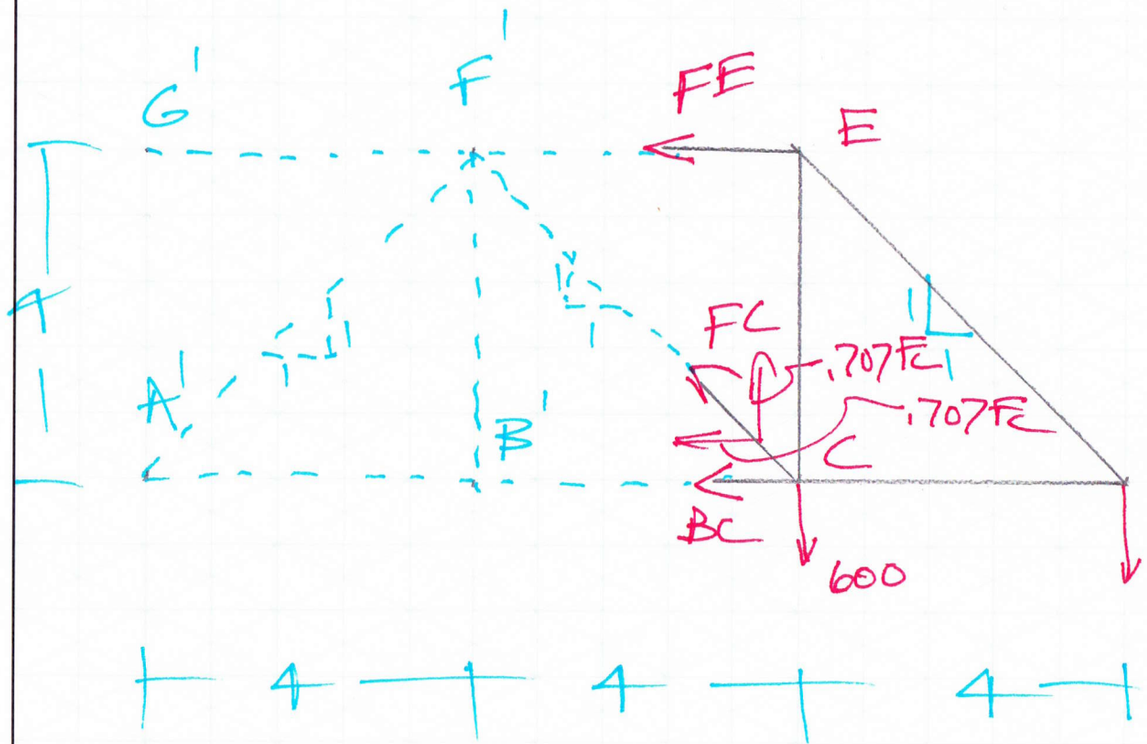
$FE = +800$ T

$+\uparrow \sum F_y = 0$

$2000 - 600 - .707 FC = 0$

$FC = +1980.2$ T

The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.



$\circlearrowleft + \sum M_C = 0$

$FE(4) - 800(4) = 0$

$FE = +800$

T

$\circlearrowleft + \sum M_{F'} = 0$

$-BC(4) - 600(4) - 800(8) = 0$

$BC = -2200$

C

$+\uparrow \sum F_y = 0$

$.707 FC - 600 - 800 = 0$

$FC = +1980.2$

T

The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.

3-D Truss

Isolate each joint

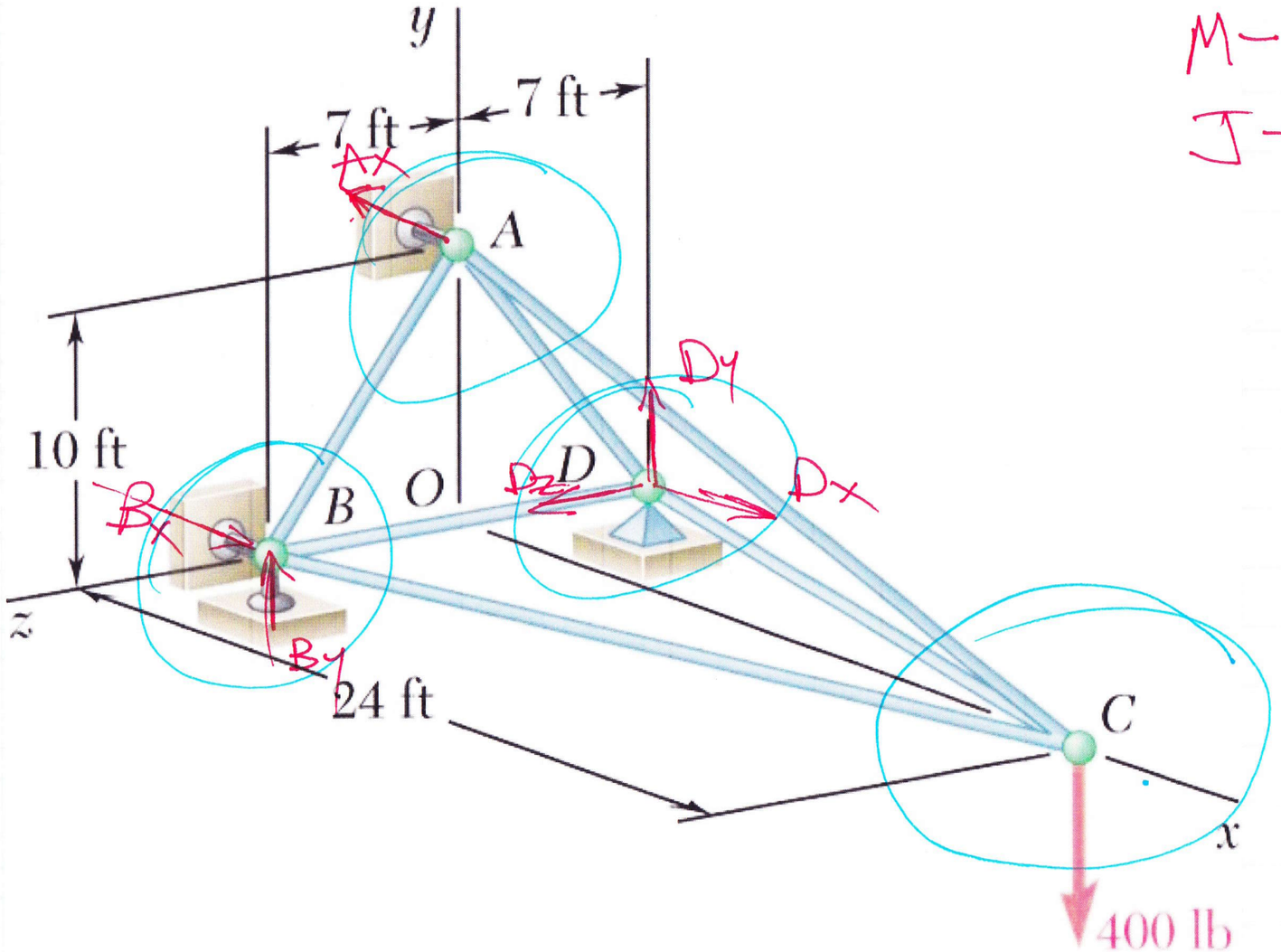
$\Sigma F_x = 0$, $\Sigma F_y = 0$, $\Sigma F_z = 0$

Space Trusses

Knowns	Unknowns
3J	R + M

Method of Sections

The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.



R-6
M-6
J-4

$3J = R + M$

$(3)(4) = 6 + 6$

$12 = 12$

The material presented in this video or image was created by W. Lynn Beason, Ph.D., P.E. and is copyrighted 2014. No part or portion of this material may be copied, transmitted, or otherwise used without the express written consent of W. Lynn Beason, Ph.D., P.E.