# Topology

# التبولوجي

Asaad Adil Abdul-Hadi

لطلاب المرحلة الرابعة –قسم الرياضيات –كلية العلوم-الجامعة المستنصرية

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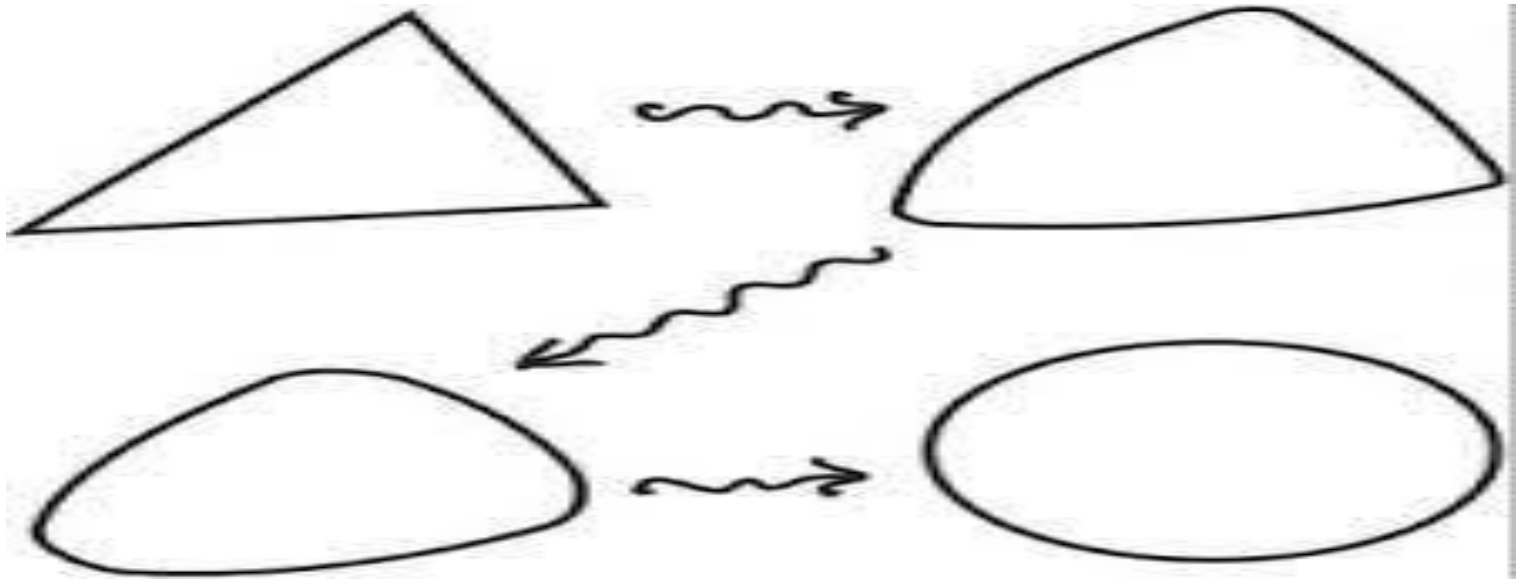
# Introduction

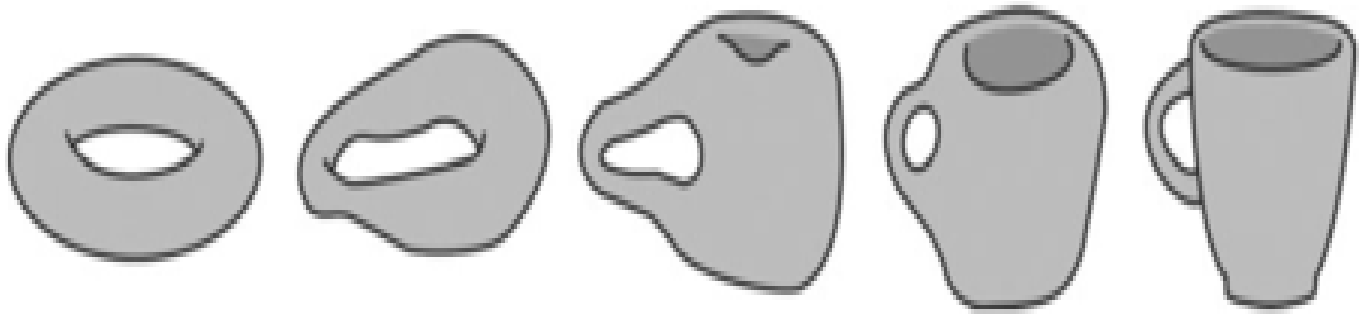
**ماذا تعني كلمة التبولوجي**

تنقسم كلمة التبولوجي الى مقطعين المقطع topo الاول

والتي تعني المكان و المقطع الثاني Topos والذي يعود الى اصل يوناني وهي كلمة

وهو logy وايضا يعود اصله الى كلمة يونانية logos وتعني الدراسة اذا فالتبولوجي هو الهندسة الحديثة في دراسة جميع التراكيب و المكونات للفضاءات المختلفة او بمعنى ابسط هو علم دراسة المكان





# Definition

**What is a topology ?**

**Let X be a nonempety set and Ƭ be a family of subsets of X, we say Ƭ is a topology  on X if satisfy the following conditions**

# Definition

**1- X,Ø ϵ Ƭ**
**2- if u,v ϵƬ , then u∩vϵƬ**
**The finite intersection of elements from Ƭ is again an elements of Ƭ**
**3- The finite or in finte  union of elements from Ƭ is again an elements of Ƭ,**
**We called a pair (X,Ƭ) topological space.**

# Examples:

**Example 1**: Let X={ a , b , c } , $\tau$={ X , Ø ,{a} }

Is $\tau$ topology on X.

**Solution**:

$\tau$ Is a topology on X

Since its satisfy the three conditions of topology

# Examples

**Example 2**: Let X={ a , b , c } , $\tau$={ X , Ø , {a,b} ,{a,c} }

Is $\tau$ topology on X.

**Solution**:

$\tau$ Is not a topology on X

Since {a,b}$\cap$ {a,c} ={a} not belong to $\tau$

Then the condition two is not satisfy

# Examples:

**Example 3**: Let X={ a , b , c } , Ƭ={ X , Ø , {a}, {b} ,{a,c} }
Is Ƭ topology on X.

**Solution**:

Ƭ Is not a topology on X

Since {a} u {b} ={a,b} not belong to Ƭ

Then the condition tree is not satisfy

# Homework

1- Let X ={1,2,3,4} , $\tau$={Ø,X,{1},{2},{3},{1,2,3}}, then is $\tau$ is a topology on X ? (H.W)

2- Let X ={2,4,5,6} , $\tau$={X,{2},{3},{4},{2,3,4}}, then is $\tau$ is a topology on X ? (H.W)

3- Let X ={F,G,H,J} , $\tau$={X,{F},{G},{J}}, then is $\tau$ is a topology on X ? (H.W)

# References

**[1]** S. Willard, General topology, Addison Wesley Publishing Company, Inc, USA,1970

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**[3]** N.Bourbaki, General topology, part I, Addison Wesley, Reading, Mass, 1996


thank
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