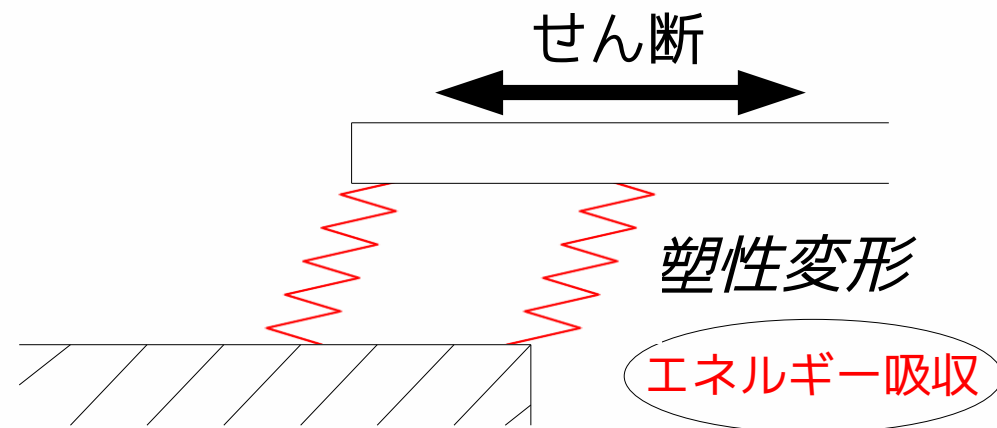
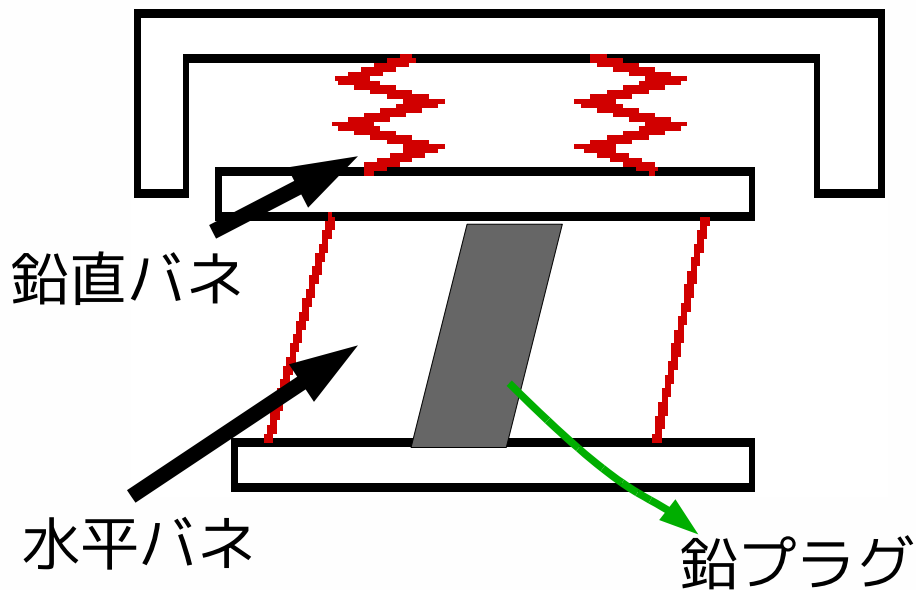
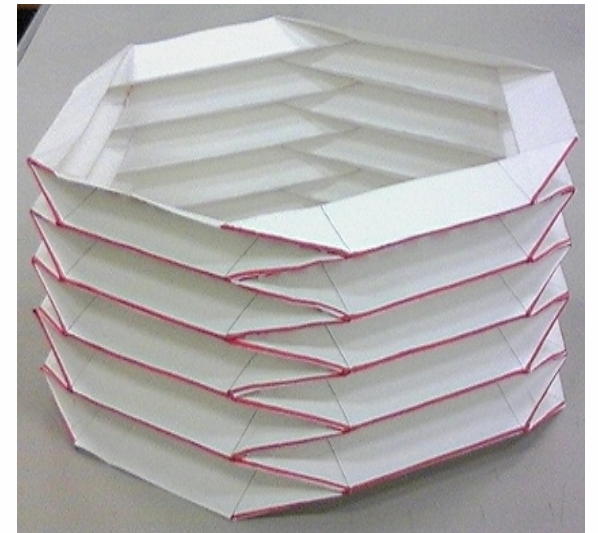


# 伸縮できる円筒折り紙構造の弾塑性挙動

環境構造工学講座 07604 石崎博之

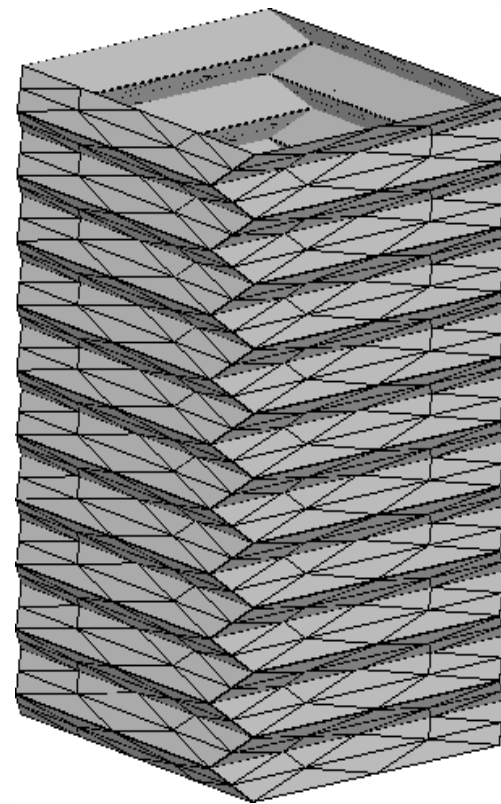
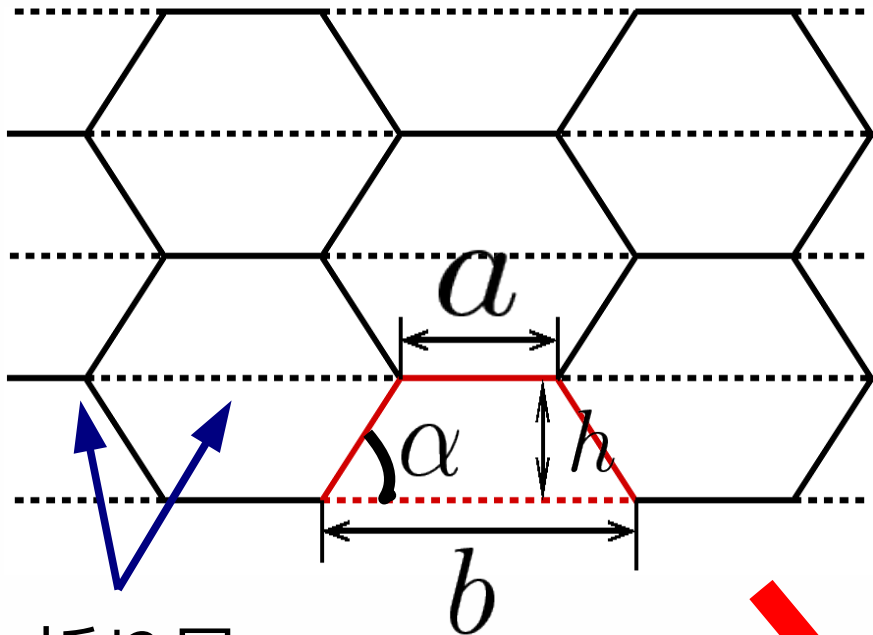
折り紙構造…折りたたみ性能、バネ性能

機能分離型支承として？



# 折り目パターン

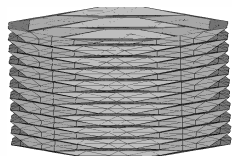
1枚の板



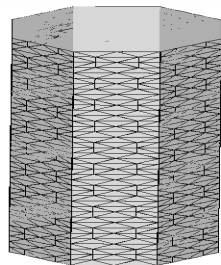
折り目



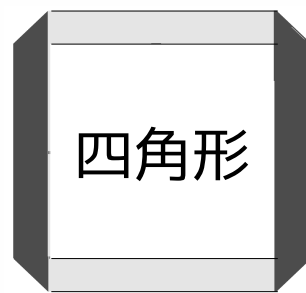
初期高さ0



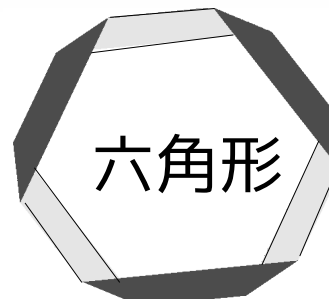
初期高さ0.5



初期高さ1



四角形



六角形



八角形

周方向パターン数

# 解析モデル

FEM解析 → Calculix

寸法

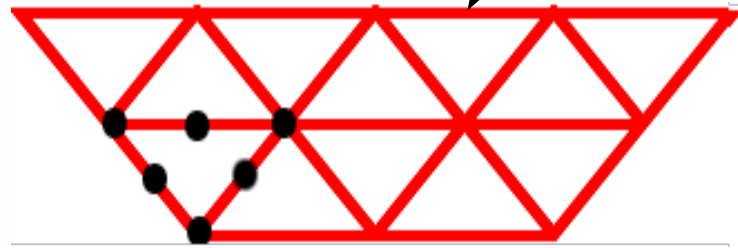
30cm

3mm

20cm

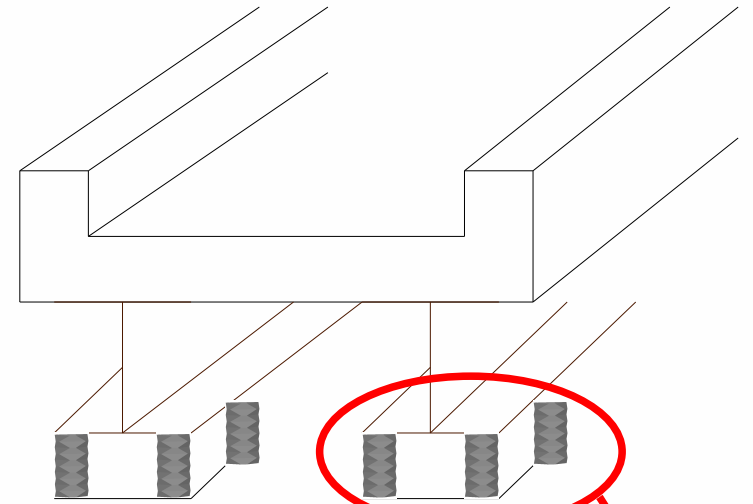
材料  
SS400

シェル要素

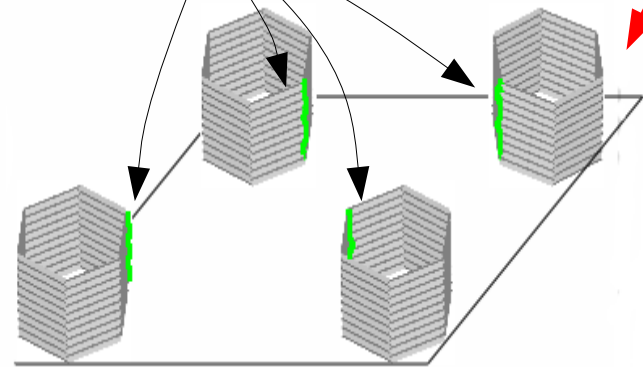


6節点、36自由度

2主桁橋



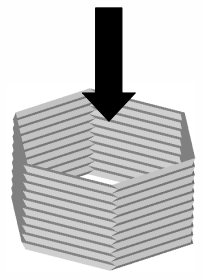
切れ目



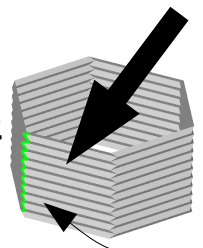
# バネ定数

## 载荷方法

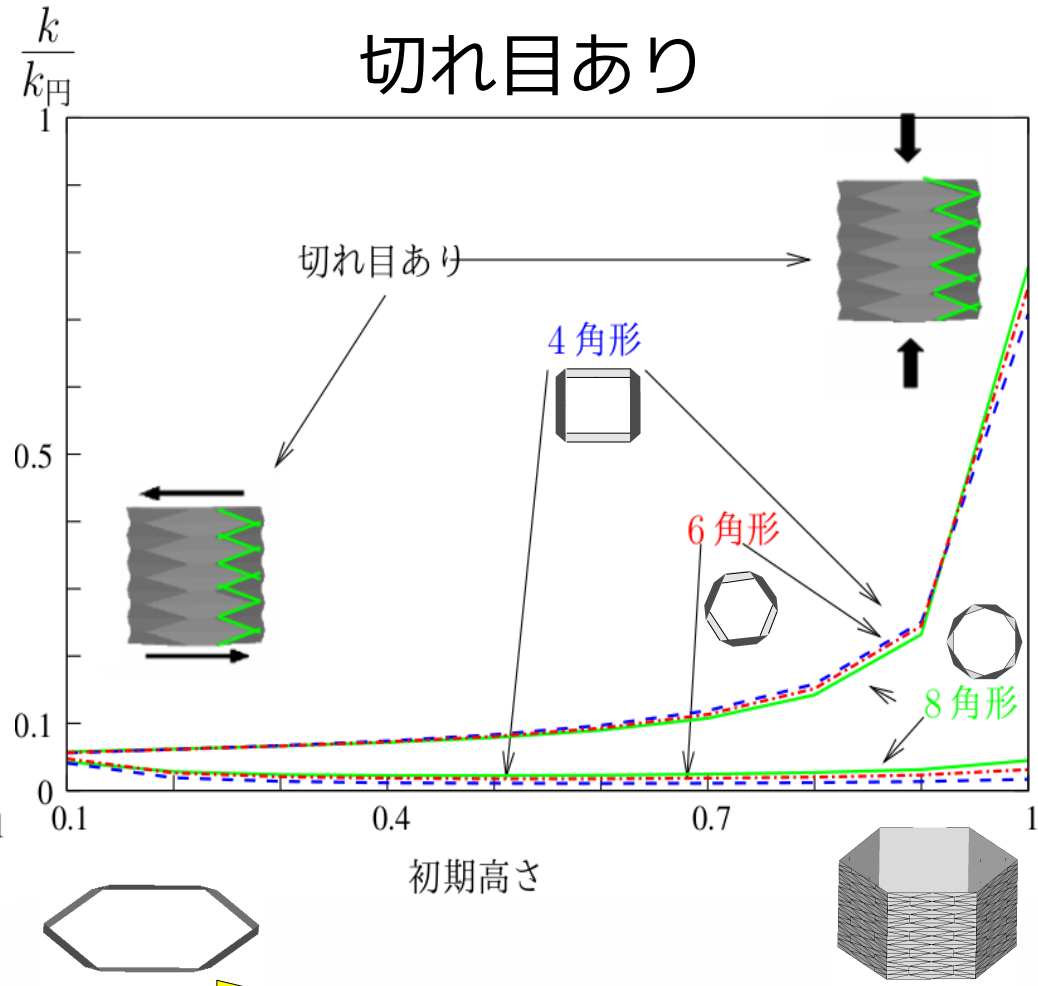
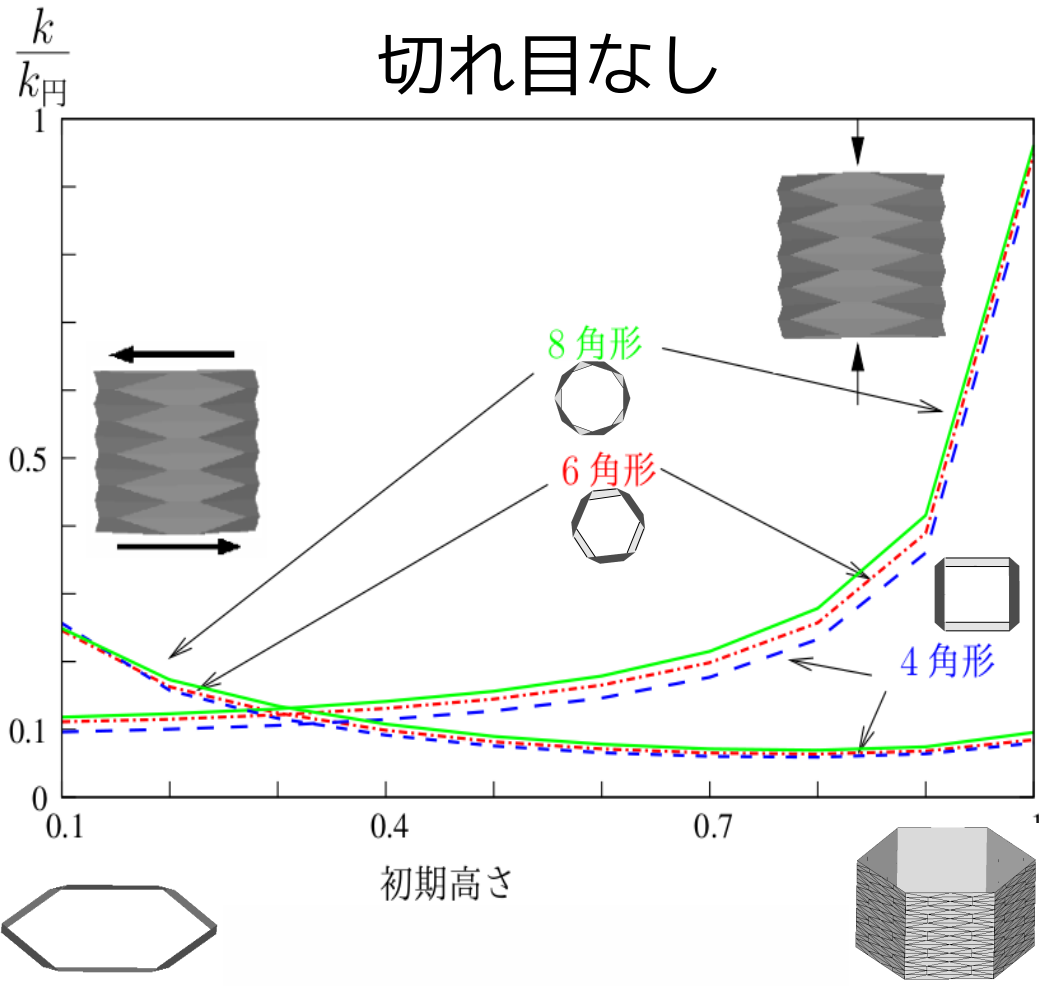
鉛直



せん断



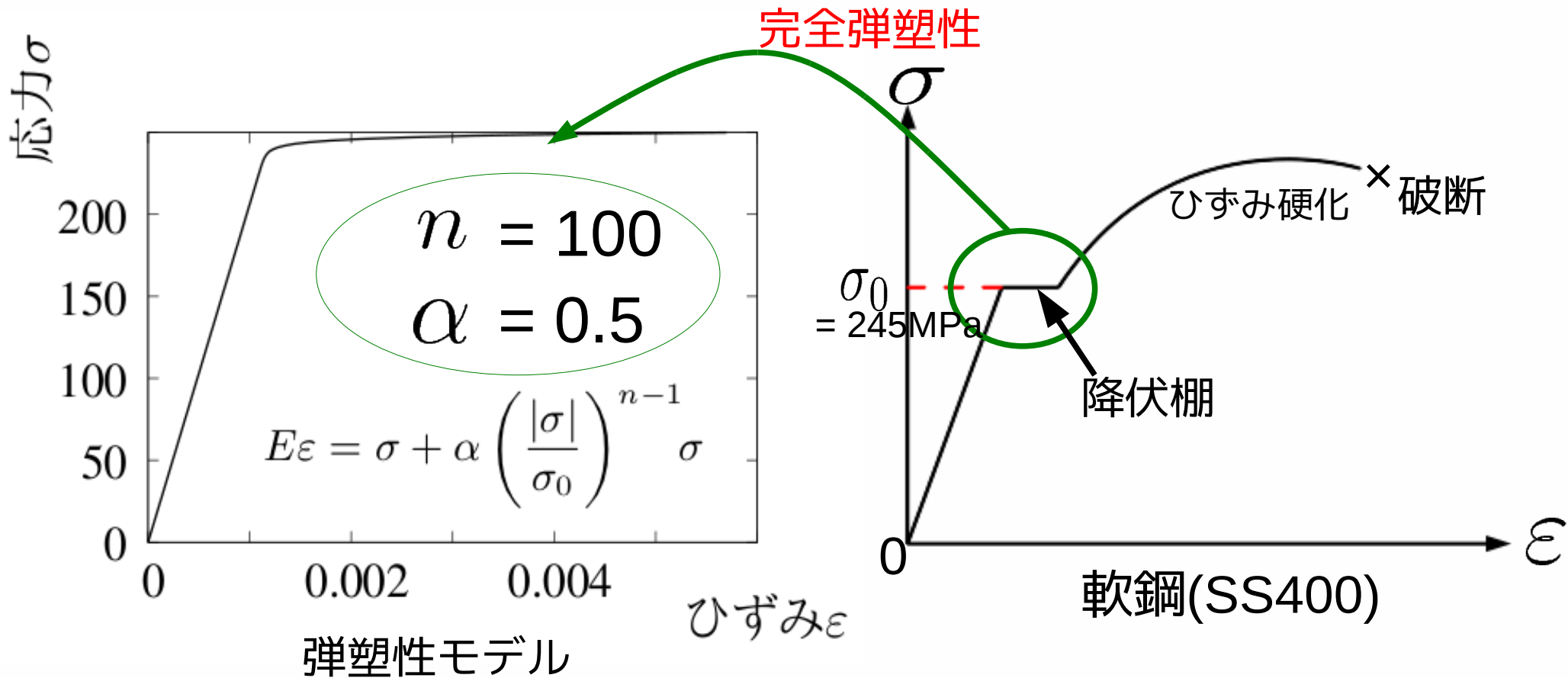
切れ目ありの場合



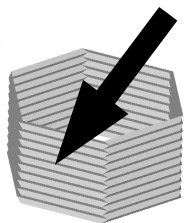
鉛直方向で2割、せん断方向で5割減少

# 弾塑性モデル

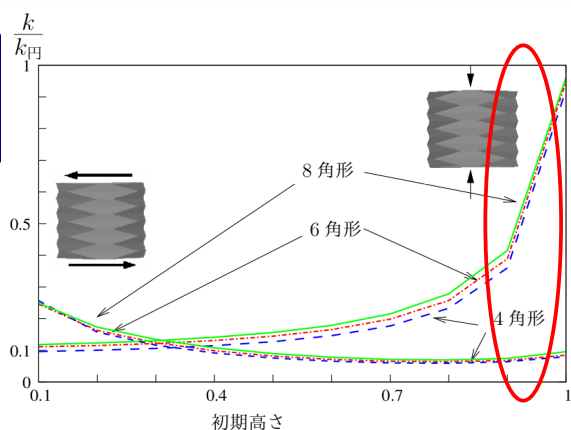
## Ramberg-Osgood法で近似



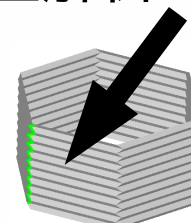
# 荷重-変位曲線



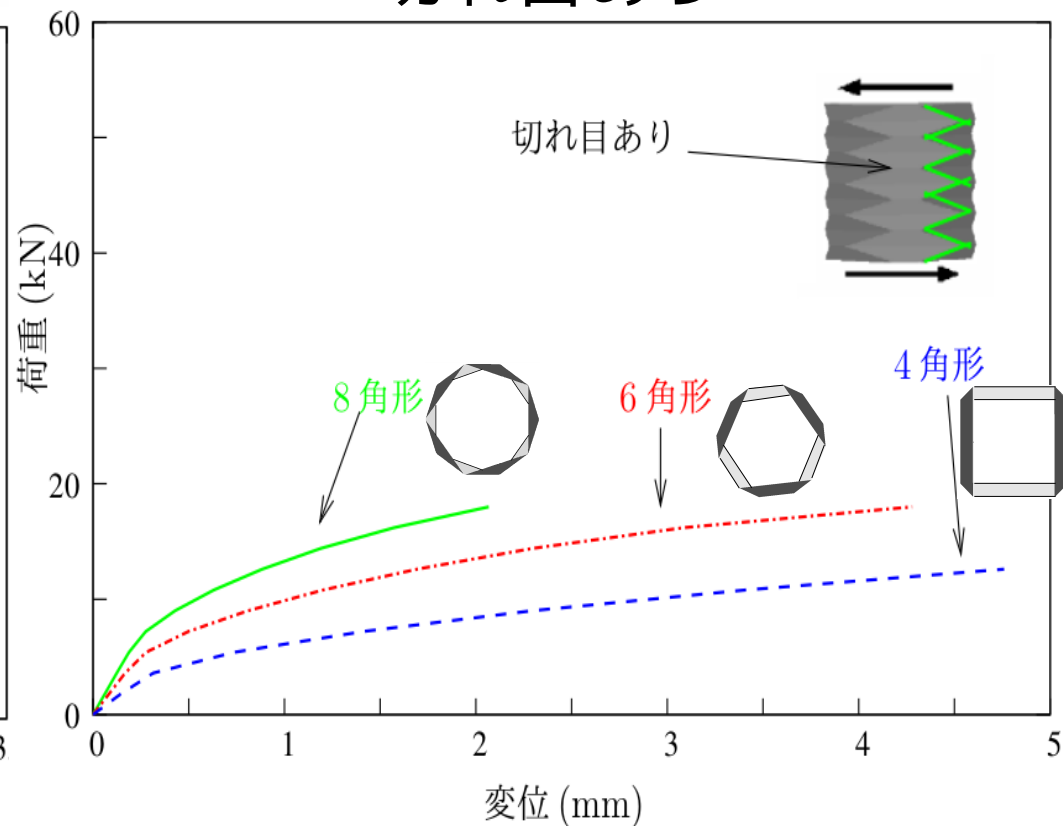
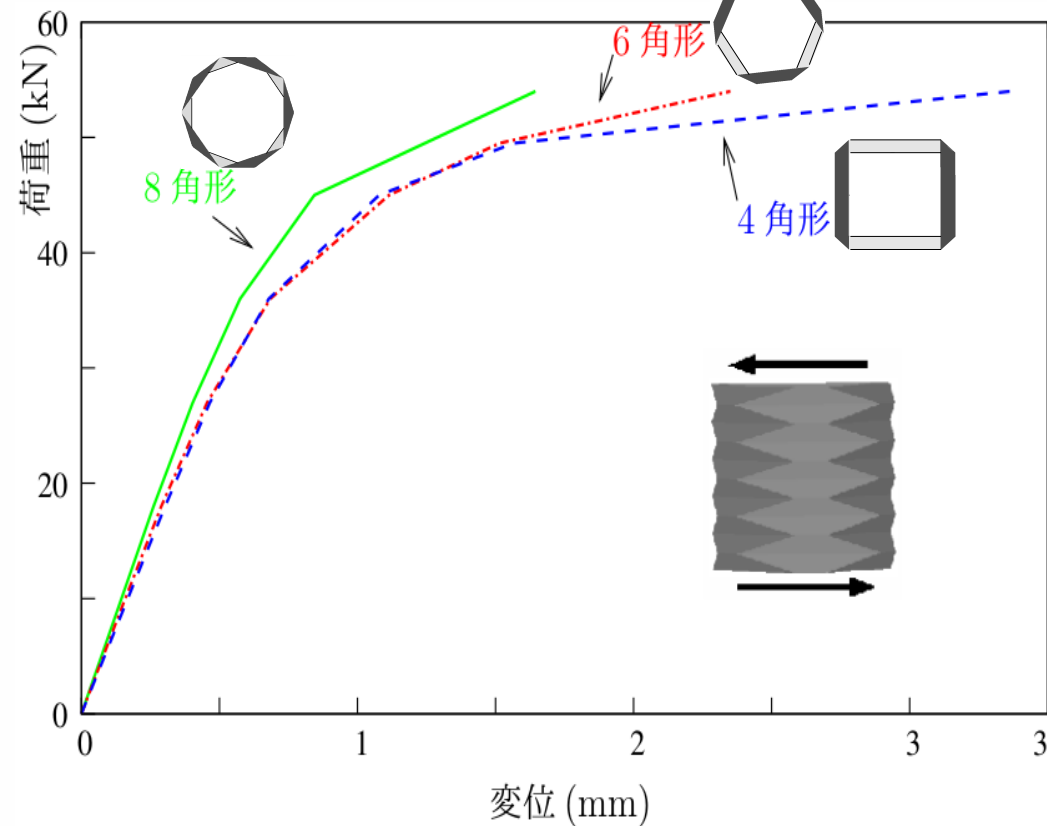
切れ目なし



初期高さ0.9でせん断方向の弾塑性解析を行う



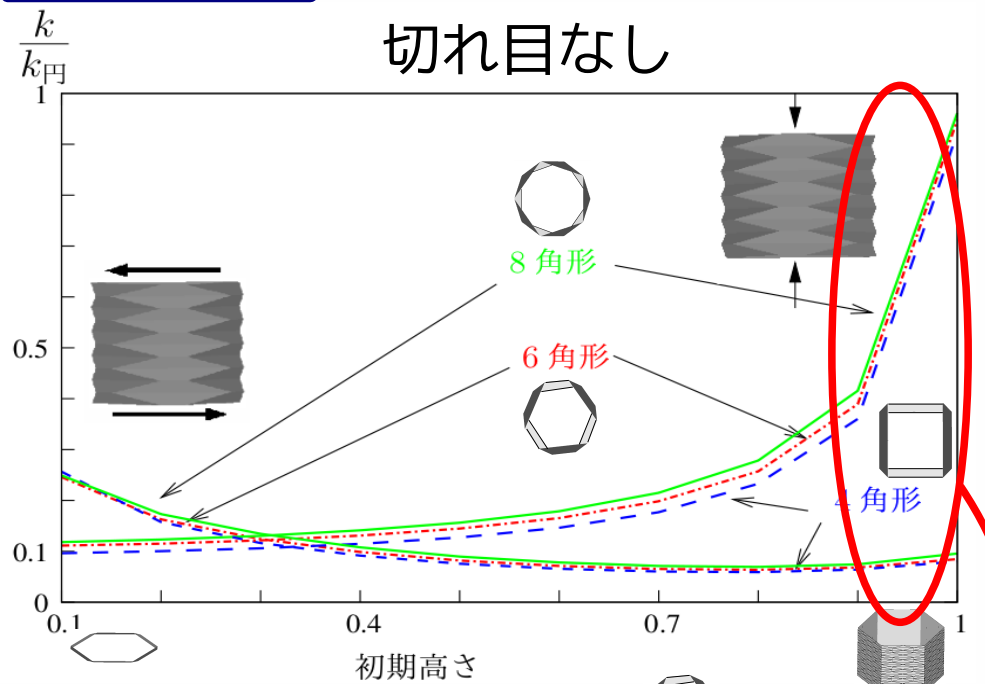
切れ目あり



剛性が約  $\frac{1}{3}$  に低下

# まとめ

## 切れ目なし



## 切れ目あり

