

# HW3: Problem 1

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## 1 Part 1

### 1.1 Subsection A

Here is the calculation for the first outer product:  $[[0.43226352 \ 0.25222353 \ 0.48671532]$   
 $[0.10984608 \ 0.06409462 \ 0.12368328]$   
 $[0.42953904 \ 0.25063381 \ 0.48364764]]$ .

### 1.2 Subsection B

The first term for the Kruskal tensor is:  $[[7.53169304 \ 8.36104576]$   
 $[6.95335795 \ 7.71902727]$   
 $[6.47565559 \ 7.18872227]$   
 $[4.39470396 \ 4.87862699]$   
 $[4.05724843 \ 4.50401252]$   
 $[3.77851157 \ 4.19458254]$   
 $[8.48045282 \ 9.41427827]$   
 $[7.82926544 \ 8.69138536]$   
 $[7.29138739 \ 8.09427885]$   
 $[1.91394119 \ 2.12469491]$   
 $[1.76697565 \ 1.96154625]$   
 $[1.64558273 \ 1.82678614]$   
 $[1.11677479 \ 1.2397485]$   
 $[1.03102116 \ 1.1445521]$   
 $[0.96018902 \ 1.06592027]$   
 $[2.15503843 \ 2.39234059]$   
 $[1.98955979 \ 2.20864026]$   
 $[1.85287512 \ 2.05690455]$   
 $[7.48422212 \ 8.30834757]$   
 $[6.90953217 \ 7.67037562]$   
 $[6.43484068 \ 7.14341346]$   
 $[4.36700493 \ 4.84787787]$   
 $[4.03167631 \ 4.47562453]$   
 $[3.75469628 \ 4.16814484]$   
 $[8.42700203 \ 9.35494175]$   
 $[7.77991897 \ 8.6366051]$   
 $[7.24543108 \ 8.04326205]]$ .

The second term for the Kruskal tensor is:  $[[ -2.55595915 \ -3.45550892]$   
 $[-2.5740198 \ -3.47992588]$   
 $[-0.99973259 \ -1.35158063]$   
 $[-0.82170374 \ -1.11089593]$   
 $[-0.82750998 \ -1.11874563]$   
 $[-0.32139951 \ -0.43451354]$   
 $[-1.61396023 \ -2.18198087]$   
 $[-1.62536463 \ -2.19739896]$   
 $[-0.63128107 \ -0.8534555]$   
 $[4.33091368 \ 5.85514478]$   
 $[4.36151634 \ 5.8965178]$   
 $[1.69398464 \ 2.29016924]$   
 $[1.39232585 \ 1.88234401]$   
 $[1.40216416 \ 1.89564483]$   
 $[0.54459146 \ 0.73625615]$   
 $[2.73475515 \ 3.69723077]$   
 $[2.7540792 \ 3.72335577]$

[ 1.06966649 1.44612721]  
[-3.54806272 -4.79677556]  
[-3.57313368 -4.83067005]  
[-1.38778193 -1.87620089]  
[-1.14065063 -1.54209368]  
[-1.14871058 -1.55299026]  
[-0.44615173 -0.60317134]  
[-2.24042397 -3.02892361]  
[-2.25625502 -3.05032627]  
[-0.87631481 -1.18472693]].

Here is the calculation for the Tucker tensor: [[[[ 5.10100643 5.80186261]

[ 4.99129859 5.53890968]  
[ 4.80561947 5.4454022 ]]

[[ 3.48145003 3.44117511]  
[ 2.84300047 3.59675864]  
[ 3.19627907 3.27594982]]

[[ 8.4494077 5.746398 ]  
[ 4.06876905 7.8071309 ]  
[ 7.33749349 5.73753646]]]

[[[ 3.33961221 6.57606924]  
[ 6.5368703 0.73014512]  
[ 3.63097401 5.34938374]]

[[ 2.38667868 3.61945962]  
[ 3.38294471 1.82517912]  
[ 2.40381302 3.1553465 ]]

[[ 6.33187165 4.42028174]  
[ 2.79251954 11.09517187]  
[ 5.4605745 5.16818593]]]

[[[ 3.30654779 6.59527835]  
[ 6.57138663 0.6350008 ]  
[ 3.60973992 5.35058505]]

[[ 2.3663087 3.62510679]  
[ 3.39564197 1.79103195]  
[ 2.38946098 3.15478383]]

[[ 6.2934687 4.39649616]  
[ 2.7687788 11.16696751]  
[ 5.42644706 5.15987497]]].