EDITAL PPGT Nº 03/2021 - SELEÇÃO DE CANDIDATOS ÀS VAGAS DO PROGRAMA DE PÓS-GRADUAÇÃO EM TRANSPORTES PARA O CURSO DE MESTRADO ACADÊMICO COM INGRESSO NO PRIMEIRO PERÍODO LETIVO DE 2022

PROVA DE MÚLTIPLA ESCOLHA

Leia com atenção as instruções abaixo:

1. A prova terá a duração total de **1h30min (uma hora e trinta minutos)**, sendo realizada em 3 (três) etapas subsequentes de 30 (trinta) minutos para cada etapa, já incluído o tempo de preenchimento dos respectivos formulários de respostas no *Google Forms*.

2. Ao final de cada etapa, o respectivo formulário será fechado para recebimento de respostas.

3. A resolução da prova será acompanhada por um responsável do PPGT por meio de chamada de vídeo realizada via *Microsoft Teams*.

4. Durante a realização da prova, o candidato deverá manter a câmera ligada e direcionada para si, de tal modo que o responsável pela aplicação da prova possa visualizá-lo.

5. Cabe ao candidato buscar a infraestrutura de acesso à internet que seja segura para a realização da prova. O Programa não se responsabiliza por problemas de ordem técnica que possam ocorrer com cada candidato.

6. O candidato receberá, no e-mail declarado no momento da inscrição no processo seletivo, os cadernos de questões de múltipla escolha e o link de acesso aos formulários eletrônicos para o preenchimento das respostas.

7. Cada caderno de questões e o respectivo formulário serão compostos por 10 (dez) questões de múltipla escolha. Para que ocorra o registro das respostas é necessário clicar no botão "enviar" após finalizar o preenchimento das respostas de cada formulário.

8. Será eliminado o candidato que não tiver finalizado e enviado pelo menos um dos três formulários.

9. Não será permitida a interferência e/ou a participação de outras pessoas, salvo em caso de candidato que tenha solicitado condição especial, em função de deficiência que impossibilite a realização da prova pelo próprio candidato.

10. Durante a realização da prova, o candidato não deverá se comunicar com outros candidatos nem sair da frente da câmera sem a autorização do responsável pela aplicação da prova.

11. A desobediência de qualquer uma das determinações constantes nas instruções acima e no edital implicará na eliminação do candidato.

Identificação do Candidato

Nome completo:	
Inscrição:	ID:

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AVISO

Durante a realização da prova, tanto as questões quanto as opções de resposta foram disponibilizadas de forma aleatória para cada candidato. Por isso, as questões e as opções de resposta do presente gabarito não estão numeradas. Para fazer a verificação das respostas, busque o enunciado correspondente.

QUESTÃO

Table 3 below refers to the results of the logit model developed by Neves et al. (2021) about possible built environmental variables explaining the walking choice in São Paulo city, Brazil. According to this table, it is possible to conclude that the following variables are not significant at 5% significance level.

Table 3
Modeling results (n = 15,935).

Group	Name	Logit model	
		Estimate	Std. error
Intercept		1.5436	0.1581
Socio-economic	Age in years	−0.0072*	0.0013
	Gender: Male	−0.3921*	0.0359
	Number of residents with less than 16 years old in the household	0.1086*	0.0197
	Vehicles per resident in the household (motorcycles included)	−1.3257*	0.0559
	Family income (BRL)	−0.00004*	4.586E-6
	Educational level in years	−0.0857*	0.0049
Density	Population density (hab./km^2) – origin	7.389E-8*	7.442E-7
	Population density (hab./km^2) – destination	4.444E-6*	8.682E-7
	Employment density (jobs/km^2) – origin	0.000016*	1.901E-6
	Employment density (jobs/km^2) – destination	−5.51E-6*	1.26E-6
Diversity	Entropy (land use mix) – origin	0.6432*	0.1089
	Entropy (land use mix) – destination	−0.1491	0.1080
Design	Street density (Km/km^2) – origin	−0.0182*	0.00454
	Street density (Km/km^2) – destination	0.0216*	0.00411
Destination accessibility	Distance to the CBD (km) – origin	−0.1598*	0.0212
	Distance to the CBD (km) – destination	0.1894*	0.0212
Distance to transit	Transit access points density (points/km^2) – origin	0.00135	0.00137
	Transit access points density (points/km^2) - destination	−0.00751*	0.00122
AIC	18,697		
McFadden's pseudo R^2	0.1451		

Source: Compiled by the authors.
* Significant at 5% significance level.

- "Entropy (land use mix) - destination" and "transit access points density (points/km^2) – destination".
- "Entropy (land use mix) - destination" and "intercept".
- All of them except "Entropy (land use mix) - destination", "Intercept" and "transit access points density (points/km^2) – destination".
- "Entropy (land use mix) - destination", "Intercept" and "transit access points density (points/km^2) – destination".

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- "Entropy (land use mix) - origin", "Intercept" and "transit access points density (points/km^2) – destination".

QUESTÃO (ANULADA)

According to the paper "An empirical investigation of financial and operational efficiency of private versus public airports" (Vasigh, B. and Haririan, M., 2003). Countries on two continents have not privatized their airports, they have limited themselves to carrying out airport administration contracts. Such countries belong to which continents?

- Europe and Australia.
- North America and Europe.
- Asia and Latin America.
- Australia and Latin America.
- Europe and Australia.

Justificativa: A partir da análise de recursos interpostos pelos candidatos, a Comissão de Seleção avaliou que a questão foi mal formulada e que não há solução possível dentre as alternativas disponíveis. Dessa forma, a Comissão optou pela anulação da questão.

QUESTÃO (ANULADA)

What is the main conclusion of Vasigh, B. and Haririan, M. (2003) in the paper "An empirical investigation of financial and operational efficiency of private versus public airports"?

- Public airports are as efficient as private airports.
- Public airports are less efficient than private airports.
- Public airports are more efficient than private airports.
- Private airports are more efficient than public airports.
- None of the alternatives.

Justificativa: A partir da análise de recursos interpostos pelos candidatos, a Comissão de Seleção verificou que houve inconsistência no gabarito da questão. Dessa forma, a Comissão optou pela anulação da questão.

QUESTÃO

It is mentioned in the Paper "A review of recent advances in the operations research literature on the green routing problem and its variants" by Marrekchi et. al. (2021), there are relevance of the negative externalities per transportation mode. Therefore, for the Road Transportation mode, the factors that have higher negative externalities are the following ones:

- Air Pollution, Greenhouse Gases, Noise Pollution and Congestion.
- Water Pollution, Accidents, Land Use and Congestion.
- Accidents, Land Use, Congestion and Air Pollution.
- Accidents, Land Use, Noise Pollution and Air Pollution.
- Land Use, Noise Pollution, Air Pollution and Water Pollution.

QUESTÃO

In the article "From XXS to XXL: Towards a typology of distribution center facilities", Onstein et al. (2021) elaborate typology to classify logistics facilities. For this, they choose some functional criteria to explain the

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types of distribution centers facilities. Select the alternative that does not contain criteria selected by the authors to develop the typology.

- Activity type.
- Product range and speed.
- Publics or private facilities.
- Market service area.
- Service days.

QUESTÃO

From the paper "Impact of the electricity mix and use profile in the life-cycle assessment of electric vehicles" (Faria et al., 2013), based on the results presented in Fig. 13 (bellow), is correct to say that:
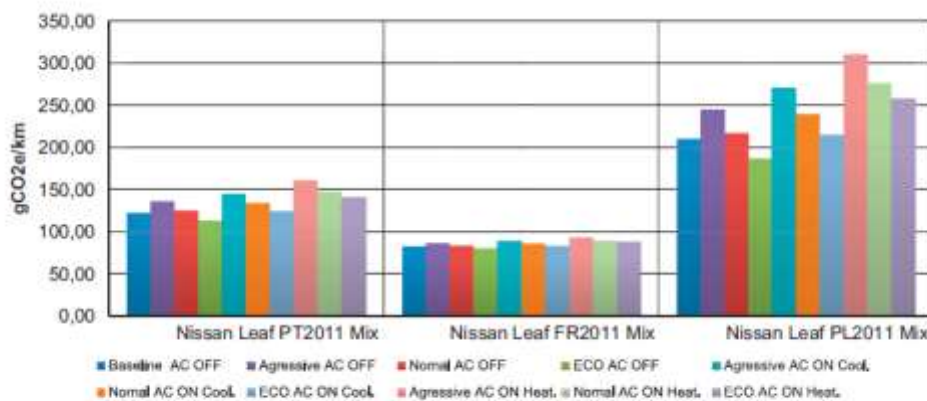

Fig. 13. Impact of the operation phase on the Nissan Leaf on the overall life-cycle emissions per km traveled, by electricity mix. The baseline scenario is based on the range for a full charge provided by the manufacturer (122 gCO_{2e}/kW h for the Portuguese mix, 83 gCO_{2e}/kW h for the French mix and 210 gCO_{2e}/kW h for the Polish mix).

- The life cycle CO_{2e} emissions of the Electric Vehicle (EV) are NOT influenced by the way an EV is used, such as the driving style and climate control settings.
- The life cycle CO_{2e} emissions of the Electric Vehicle (EV) are highly influenced by the way an EV is used (driving style and climate control settings), only when considering an electricity mix with low emissions, such as the French mix.
- The life cycle CO_{2e} emissions of the Electric Vehicle (EV) are more influenced by the way an EV is used (driving style and climate control settings), when considering an electricity mix with higher emissions.
- The life cycle CO_{2e} emissions of the Electric Vehicle (EV) are NOT influenced by the way an EV is used (driving style and climate control settings), when considering an electricity mix with medium emissions, such as the Portuguese mix.
- The baseline of life cycle CO_{2e} emissions of the Electric Vehicle (EV) is the same and NOT influenced by the emissions of the electricity mix.

QUESTÃO

In the paper "*Modeling travel mode choice under social influence for the Brazilian context*" (Mota et al., 2020), the theoretical framework of this study is mainly based on (check the true option):

- The study of social activities-travel.
- Individual's social network.
- The study of the transportation mode choice.
- Social networks and travel behavior.

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- Other related travel choices.

QUESTÃO

In the paper "An analysis of the built environment and auto travel in Halifax, Canada" (Chowdhury and Scott, 2020) the authors present discussions about the impact of built environment and travel behavior. Consider the statements below and choose the correct answer.

   I. The importance to study the impacts of built environment and travel behavior is support strategies and land-use policies to promote sustainable transportation systems.
   II. Researchers are unanimous in stating that built environment affects travel behavior.
   III. Compact cities tend to promote short trips and less auto dependence.

   - All statements are correct.
   - Statements I and II are correct.
   - Statements I and III are correct.
   - Statements II and III are correct.
   - All statements are incorrect.

QUESTÃO

How is this article "Airport slots, secondary trading, and congestion pricing at an airport with a dominant network airline" (Noto, 2020) different from most other papers dealing with his subject?

   - It includes discussion of airport slots allotted to airlines.
   - It uses the discrete-choice model.
   - Airlines in the model do not need to be homogeneous.
   - It is not an empirical paper.
   - Airlines engage in Cournot-type competition.

QUESTÃO

According to the paper "An empirical investigation of financial and operational efficiency of private versus public airports" (Vasigh, B. and Haririan, M., 2003). What is the second way to involve the private sector in airports?

   - Privatizing airports.
   - Granting airports.
   - Going public.
   - Restricting the opening of capital.
   - None of the alternatives.

QUESTÃO

It is mentioned in the Paper "Operations Research for green logistics – An overview of aspects, issues, contributions and challenges" by Dekker et. al. (2012), the energy use and emissions for typical transport units of different modes. Therefore, according to this mentioned paper, the modes that have higher emissions of CO_2 (g/t/km), in the order, are the following ones:

   - Boieng 747-400 < Heavy Truck < S-Type Container Vessel (6500 TEU) < Rail-Electric.
   - Rail Diesel < Rail Electric < Heavy Truck < Boeing 747-400.
   - Rail Electric <   Heavy Truck < Boeing 747-400 < S--Type Container Vessel (6500 TEU).

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- Rail Electric < Rail Diesel < Heavy Truck < Boeing 747-400.
- PS--Type Container Vessel (11000 TEU) < Heavy Truck < Rail Electric < Rail Diesel.

QUESTÃO

According to Onstein et al. (2021) in "From XXS to XXL: Towards a typology of distribution center facilities", the typology developed includes eight types of logistics facilities. One of the following alternatives is not a type of logistics facilities identified by the authors' typology.

- Parcel lockers and pick-up points.
- City hubs.
- Regional food wholesale and retail facilities.
- National retail and e-commerce facilities.
- Transport terminal.

QUESTÃO

The manuscript of Silva and Santos (2020) (Impact on average vehicle speed with the introduction of educational actions and optical character recognition equipment in the Federal District, Brazil) shows an analysis of the impact on average vehicle speed with the introduction of educational actions and OCR equipment in the Federal District, Brazil. They were interested in evaluating if the driver reduces the speed of the vehicle, on average, when a notification is sent to the driver's house. According to the Table 6 below, it is possible to say that:

Table 6 – Summary of the modified statistical analyses (Wilcoxon test) of data with a non-normal distribution gathered before and after the second educational action (notification of drivers identified in the Week 2 database)

Highway	Period Before	Period After	Sample n	$\bar{D}$	S_D	Wilcoxon test (p-value)	Reject H₀?
DF-002	Week 3	Week 6	6	-11.6529	6.5350	-10.5 (0.0156)	Reject
	Week 4	Week 6	5	-5.6857	2.9624	-7.5 (0.0312)	Reject
DF-009	Week 3	Week 5	9	-13.1635	7.7752	-22.5 (0.0019)	Reject
	Week 3	Week 6	8	-11.1510	4.1355	-18 (0.0039)	Reject
	Week 4	Week 5	3	-7.1789	13.0357	-2 (0.0250)	No
	Week 4	Week 6	4	-0.5517	5.8454	-1 0.4375	No
DF-095	Week 3	Week 5	8	-6.6948	8.2240	-14 (0.0273)	Reject
	Week 4	Week 5	4	-0.2294	4.1769	0 (0.5000)	No
	Week 4	Week 6	1	-6.2248	-	-0.5 (0.5000)	No

Criterion for Reject H₀? decision: No if p-value >0.05, otherwise, reject.

- On average, there was a significant difference, considering 5% significance level, between Week 3 and Week 6 for DF-009.
- On average, there was a significant difference, considering 5% significance level, between Week 4 and Week 6 for DF-009.
- On average, there was a significant difference, considering 5% significance level, between Week 4 and Week 6 for DF-095.

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- On average, there was not a significant difference, considering 5% significance level, between Week 3 and Week 6 for DF-002.
- On average, there was not a significant difference, considering 5% significance level, between Week 3 and Week 5 for DF-095.

QUESTÃO

In the paper "*Modeling travel mode choice under social influence for the Brazilian context*" (Mota et al., 2020), the independent variables were divided into three groups. Check the true option.

- Social, Sociodemographic, Built Environment.
- Personal, Household, Mobility Resources available.
- Social, Personal/Household, Travel and Built Environment.
- Personal, Household, Social network Characteristics.
- Social, Personal/Household, Travel Time and Built Environment.

QUESTÃO

From the paper "Impact of the electricity mix and use profile in the life-cycle assessment of electric vehicles (Faria, R. et al., 2013), based on the results presented in Fig. 16, is correct to say that:
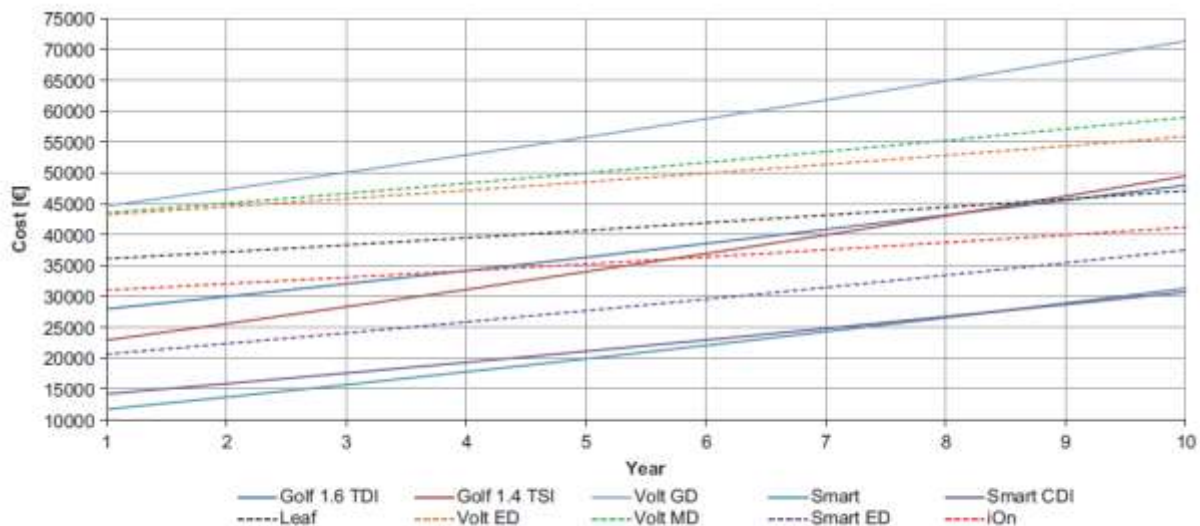

Fig. 16. Cumulative costs of ownership for the considered vehicles during their life-cycle. Only the costs directly associated with the use of the vehicle were considered, depreciation and interests were not taken into account.

- The payback period of Electric Vehicles (EV) is always lower than 9-10 years when compared to the Internal Combustion Engine Vehicles (ICEV).
- The payback period of Electric Vehicles (EV) can take up to 9-10 years when compared to the Internal Combustion Engine Vehicles (ICEV) from the same category, and this is due to higher initial cost of the EV.
- The payback period of the Electric Vehicles (EV) **Nissan** Leaf is less than 9-10 years when compared to the conventional Smart with Internal Combustion Engine Vehicles (ICEV), and this is due to higher initial cost of the EV.
- The payback period of the Electric Vehicles (EV) **Smart** ED is less than 9-10 years when compared to the conventional **Smart** with Internal Combustion Engine Vehicles (ICEV), and this is due to higher initial cost of the EV.
- The payback period of the Electric Vehicles (EV) higher than 9-10 years only for the **Smart** with Internal Combustion Engine Vehicles (ICEV), and this is due to lowest initial cost of the EV.

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QUESTÃO

Considering the conclusions of the paper "An analysis of the built environment and auto travel in Halifax, Canada" (Chowdhury and Scott, 2020), it is incorrect to say:

- Attitude variables included in the model might not be sufficient to represent residential and travel mode.
- Future studies using STAR data set might consider adopting other methods to control for residential self-selection.
- Include transit and walk distance would provide a better understanding of the process.
- The study contributes no literature knowledge by addressing simultaneously key issues that make the TB-BE link difficult to analyze.
- The method used do not provides a finding that the inclusion of proper BE variables can handle the spatial autocorrelation problem.

QUESTÃO

The following is one of the main results of the paper "Airport slots, secondary trading, and congestion pricing at an airport with a dominant network airline" (Noto, 2020):

- Network density social benefits exhibit increasing returns.
- Distribution of airline slots, secondary slot trading and congestion pricing are the three main allocation instruments.
- Airlines engage in Cournot-type competition.
- When "use obligation" is present, airlines will engage in secondary trading of slots.
- Each of the three allocation instruments (distribution of airline slots, secondary slot trading, and congestion pricing) yield ambiguous welfare effects.

QUESTÃO

One of the references is related to the free flow speed FFS. According to Silvano et al.(2020, It is correct to say that:

- The free flow speed (FFS) distribution is important for capacity analysis, determination of the level-of-service, and setting speed limits.
- The free flow speed (FFS) distribution is important to define parameters for simulation studies and to estimate the impact of a specific countermeasure on road safety.
- The free flow speed (FFS) distribution reflects the influence of various factors of different types of transportation facilities such as road geometry, traffic regulations, driver preferences, etc.
- The free flow speed (FFS) distribution is important to establish speed limits for design purposes and to establish the ideal traffic conditions in traffic performance studies.
- All of the alternatives.

QUESTÃO

The manuscript of Silva and Santos (2020) (Impact on average vehicle speed with the introduction of educational actions and optical character recognition equipment in the Federal District, Brazil.) shows an analysis of the impact on average vehicle speed with the introduction of educational actions and OCR equipment in the Federal District, Brazil. To compare the average vehicle speed before and after the educational actions, they have used two statistical tests: paired t-test and Wilcoxon test. About these two tests, it is correct to say:

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- The paired t-test is a nonparametric test used when the distribution of the differences (before-after) is not normal.
- The paired t-test is a parametric test used when the distribution of the differences (before-after) is normal.
- The Wilcoxon is a parametric test used when the distribution of the differences (before-after) is not normal.
- The Wilcoxon test is a parametric test used when the distribution of the differences (before-after) is not normal.
- The paired t-test and Wilcoxon test produce the same result.

QUESTÃO

The study reported in the paper "An analysis of the built environment and auto travel in Halifax, Canada" (Chowdhury and Scott, 2020) uses, besides built environment and travel behavior theories, Residential Self Selection (RSS) approach. Why is this approach used?

- RSS variables are useful to analyze attitudes and preferences associated to travel behavior.
- RSS variables are useful to analyze built environment at the respondent's residence location.
- RSS variables are helpful to understand accessibility.
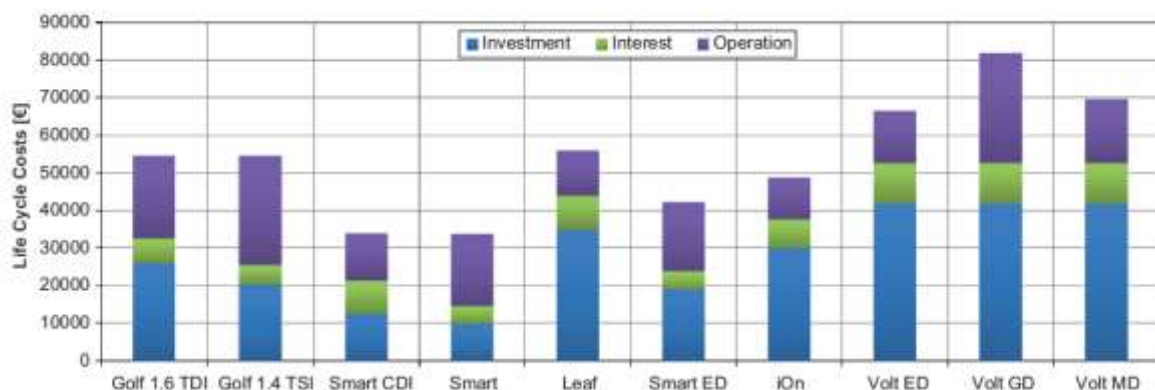- RSS variables are robust in the database.
- All of the alternatives.

QUESTÃO

In the paper "*Modeling travel mode choice under social influence for the Brazilian context*" (Mota et al.), from a larger sample, the following research is recommended (check the true option):

- To analyze social influence stratified by gender.
- To model social influence as a function of the distance by bike.
- To verify the changes caused in the social influence of the climated.
- Do not include other social norms and attitude.
- To consider possible disruption associated with discrete choice.

QUESTÃO

From the paper "Impact of the electricity mix and use profile in the life-cycle assessment of electric vehicles (Faria R. et al., 2013)", based on the results presented in Fig. 15 for the Life Cycle Costs of vehicles, is correct to say that:

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- The total Life Cycle costs (Investment + Interest + Operation) of the gasoline vehicle **SMART** is greater than the electric vehicle **SMART ED.**
- The total Life Cycle costs (Investment + Interest + Operation) of the gasoline vehicle **SMART** and the electric vehicle **SMART ED** are highly influenced by the operation costs.
- The total Life Cycle costs (Investment + Interest + Operation) of the Diesel vehicle **SMART CDI** is less than the gasoline vehicle **SMART** due to the investment costs.
- The total Life Cycle costs (Investment + Interest + Operation) of the electric vehicle **SMART ED** is only greater than the gasoline vehicle **SMART** due to investment costs.
- The total Life Cycle costs (Investment + Interest + Operation) of the Diesel vehicle **SMART CDI** is greater than the electric vehicle **SMART ED** due to the operation costs.
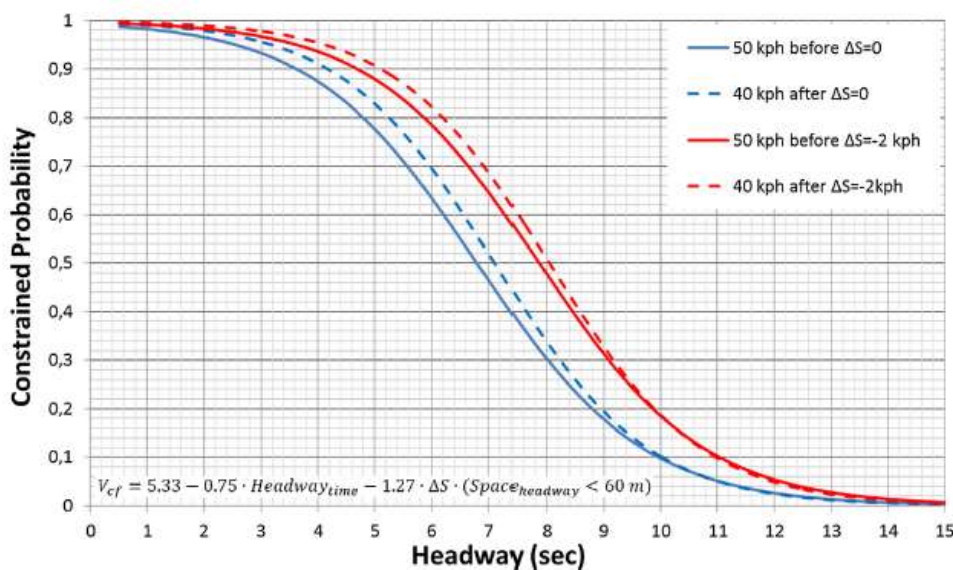
QUESTÃO

According to the paper "Satisficing game approach to collaborative decision making including airport management" (Almeida et al., 2016), in the development of Satisficing Game Approach to Collaborative Decision Making, it is correct to say:

- The Index of Caution can not be used to quantify the degree to which the airport manager agrees to bear the risk when taking a GDP decision
- The Index of Caution is used to quantify the degree to which the airport manager agrees to bear the risk when taking a GDP decision.
- The Index of Caution is used to quantify the degree to which the airport manager does not agree to bear the risk when taking a GDP decision.
- The Index of Caution is not used to quantify the degree to which the airport manager does not agree to bear the risk when taking a GDP decision.
- All about are not right.

QUESTÃO

The plot below gives the probability to be constrained and speed limit changes proposed in the Silvano et al.(2020) study. The following alternatives are correct, except:

Legend:
- 50 kph before $\Delta S=0$
- 40 kph after $\Delta S=0$
- 50 kph before $\Delta S=-2$ kph
- 40 kph after $\Delta S=-2$kph

$$V_{cf} = 5.33 - 0.75 \cdot Headway_{time} - 1.27 \cdot \Delta S \cdot (Space_{headway} < 60\ m)$$

- For both cases, the impact of the speed limit reduction change was small but as expected, increases the constrained probability.

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- For the case where the relative speed is zero, at headways larger than 10 s the constrained probability was lower than 10%, and agree the literature.
- For the case where the relative speed is -2 km/h, at headways larger than 11 s the constrained probability is lower than 10%.
- The results for relative speeds equal to zero show that with 6 s time headway, the probability of the constrained state is 63% with 50 km/h and 78% with 40 km/h.
- For the case where the relative speed is zero, the result was the same of the literature, with constrained probability high for headways shorter than 4 s.

QUESTÃO

According to Onstein et al. (2021) in the article "From XXS to XXL: Towards a typology of distribution center facilities", the type of activity criterion is important to differentiate logistical facilities based on the main activity performed at the facility. Which of the following contains a logistics facility activity listed by the authors of the article?

- Screening.
- Grouping.
- Order formation.
- Manufacturing.
- Cross-docking.

QUESTÃO

It is presented in the Paper "Optimizing station location and fleet composition for a high-speed rail line" by Repolho et. al. (2016) a new optimization model for assisting in the strategic decisions involved in the launch of a new highspeed rail (HSR) line. The model determines the location of stations and the composition of the fleet so that net public benefits are maximized, while taking into account in an approximate fashion the impact of subsequent tactical decisions on rail ridership. Nevertheless, the presented model has some limitations. Therefore, among the following characteristics, which of the following evaluations is considered in the model:

- The model does NOT consider a single class for the demand, it considers market segments (e.g. business, family travel, leisure) in its implementation.
- The model did NOT consider a simple demand distribution to estimate time-of-day fluctuations. Therefore, the model assumed different demand distributions for centers along the HSR route.
- The authors state that their model is suitable for any region even if the region has a higher density population.
- The model used a simple demand distribution to estimate time-of-day fluctuations. This same distribution was applied at every population center along the proposed HSR line.
- The model is NOT applied to a real world project and unfortunately did NOT identify solutions corresponding to increases in net public benefits, in rail ridership and in ticket revenues even for the less favorable fleet cost scenario.

QUESTÃO

The methodology of the paper "Airport slots, secondary trading, and congestion pricing at an airport with a dominant network airline" (Noto, 2020) relies importantly on:

- General equilibrium analysis.
- Dynamic optimization.
- Cournot equilibrium.

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- Stackelberg equilibrium.
- Linear programming.

QUESTÃO

Considering the paper "An analysis of the built environment and auto travel in Halifax, Canada" (Chowdhury and Scott, 2020), the reasons why there are no consensus on the impacts of built environment and travel behavior are:

- Different ways of measuring TB and the BE.
- Use of different geographical scales of measurement.
- Diverse methods.
- Variety of ways of controlling for the residential self-selection effect.
- All statements are correct.

QUESTÃO

According to the paper "Stable two-sided matching of slot allocation in airport collaborative decision making by top trading cycles mechanism "(Souza, M. et al., 2018), the Collaborative Decision Making (CDM) includes concepts of property, prioritization, justice and efficiency in resource allocation and aims to improve the exchange of information among the following agents:

- Passengers and Air Traffic Control (ATC) center.
- Air Traffic Control (ATC) center, airlines, airport managers and others.
- Air Traffic Control (ATC) center and controllers.
- Airport manager and users.
- Shopping center and airport managers.

QUESTÃO

The Silvano et al. (2020) study consider the speed limit change from 50km/h to 40 km/h. All the following sentences related to the 40km/h as posted speed limit are correct, except:

- The highest reduction of the speed limit change is for land use.
- The PSL reduction decreases the impact of parking-only by 0.21 km/h.
- The PSL reduction decreases the impact of sidewalk by 2.47 km/h.
- The PSL reduction decreases the impact of the interaction of parking and sidewalk by 3.16 km/h.
- The PSL reduction decreases the impact of the land use by 4.36 km/h.

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