Scientific papers on 'Taper functions'

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22 ago 2018

Introduction

2018 Forest Inventory course - First results of the collective assignement

Students, as homework, were asked to search for scientific papers presenting 'taper functions' and to compile a collective Rmarkdown document shared using GIT.
Rearranging their work, this document lists their findings.

Analysed articles

##Article ID 1 : *(Scolforo, McTague, Raimundo, et al., 2018)* **Comparison of taper functions applied to eucalypts of varying genetics in {Brazil}: application and evaluation of the penalized mixed spline approach**

Student	NA
Title.student	Comparison of taper functions applied to eucalypts of varying genetics in Brazil: Application and evaluation of the penalized mixed spline approach
Authors.student	Scolforo, H.F., McTague, J.P., Raimundo, M.R., Weiskittel, A., Carrero, O., Scolforo, J.R.S.
Year.student	2017
Species	Eucalypts
Base.URL	http://www.nrcresearchpress.com/doi/10.1139/cjfr-2017-0366#.W2Sb6Lhx02w
Paper.local.file	NA
Equations	NA

##Article ID 2 : *(Warner, Jamroenprucksa, and Puangchit, 2016)* **Development and evaluation of teak ({Tectona} grandis {L}.f.) taper equations in northern {Thailand}**

Student	Angelo Manca
Title.student	Development and evaluation of teak (Tectona grandis L.f.) taper equations in northern Thailand,
Authors.student	Andrew J. Warner, Monton Jamroenprucksa, Ladawan Puangchit,
Year.student	2016
Species	Tectona grandis L.f.
Base.URL	https://www.sciencedirect.com/science/article/pii/S2452316X16302459?via%3Dihub
Paper.local.file	1-s2.0-S2452316X16302459-main.pdf

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	$$d_{ub} = (H-h)\left(S + \beta_3 (h - h_1) + D_{ub}/[H - h_1]\right) \quad (2)$$
	where $S = \beta_1 \beta_2^2 (h_1 - h) / [(1+\beta_2 h)(1+\beta_2 h_1)(1+\beta_2 H)]$
	$\beta_1 = c_0 + c_1 H + c_2 H^2 + c_3 (D_{ub}/10)^2$
	$\beta_2 = d_0 + d_1 H + d_2/H$
	$\beta_3 = f_0 + f_1 H + f_2/H + f_3 (D_{ub}/10) + f_4 (D_{ub}/10)^2$
Equations	

##Article ID 3 : *(Tang, PÃ©rez-Cruzado, Fehrmann, et al., 2016)* **Development of a {Compatible} {Taper} {Function} and {Stand}-{Level} {Merchantable} {Volume} {Model} for {Chinese} {Fir} {Plantations}**

Student	NA
Title.student	Development of a Compatible Taper Function and Stand-Level Merchantable Volume Model for Chinese Fir Plantations
Authors.student	Xiaolu Tang,César Pérez-Cruzado,Lutz Fehrmann,Juan Gabriel Álvarez-González,Yuanchang Lu,and Christoph Kleinn,
Year.student	2016
Species	Cunninghamia lanceolata [Lamb.] Hook
Base.URL	https://www.ncbi.nlm.nih.gov/pubmed/26799399
Paper.local.file	pone.0147610.pdf
	Taper function:
	$$d = c_1 \sqrt{H^{(k-b_1)/b_1 \bullet (1-q)^{(k-\beta)/\beta} \bullet \alpha_1^{I_1} \bullet \alpha_2^{I_2}}} \quad (2)$$
	where I_1 = 1, if $p_1 \le q \le p_2$; 0 otherwise;
	I_2 = 1, if $p_2 \le q \le 1$; 0 otherwise
	p_1 and p_2 are the relative height from the ground level where the two inflection points assumed in the model occur.
	$$\beta = b_1^{1-(I_1+I_2)} \bullet b_2^{I_1} \bullet b_3^{I_2},\ a_1 = (1-p_1)^{\frac{(b_2-b_1)\bullet k}{b_1 \bullet b_2}},\ a_2 = (1-p_2)^{\frac{(b_3-b_2)\bullet k}{b_2 \bullet b_3}}$$
	$$r_0 = (1-h_{st}/H)^{\frac{k}{b_1}},\ r_1 = (1-p_1)^{\frac{k}{b_1}},\ r_2 = (1-p_2)^{\frac{k}{b_2}}$$
	$$c_1 = \sqrt{\frac{a_0 \bullet D^{a_1} \bullet H^{a_2 - k/b_1}}{b_1 \bullet (r_0 - r_1) + b_2 \bullet (r_1 - \alpha_1 \bullet r_2) + b_3 \bullet \alpha_1 \bullet r_2}} $$
Equations	

##Article ID 4 : *(Corral-Rivas, Vega-Nieva, RodrÃguez-Soalleiro, et al., 2017)* **Compatible {System} for {Predicting} {Total} and {Merchantable} {Stem} {Volume} over and under {Bark}, {Branch} {Volume} and {Whole}-{Tree} {Volume} of {Pine} {Species}**

Student	Maria Chiara Ruggiu

Title.student	Compatible System for Predicting Total and Merchantable Stem Volume over and under Bark, Branch Volume and Whole-Tree Volume of Pine Species"
Authors.student	José Javier Corral-Rivas, Daniel Jose Vega-Nieva, Roque Rodríguez-Soalleiro, Carlos Antonio López-Sánchez, Christian Wehenkel, Benedicto Vargas-Larreta, Juan Gabriel Álvarez-González and Ana Daría Ruiz-González.
Year.student	2017
Species	Pinus cooperi, Pinus durangensis
Base.URL	http://www.mdpi.com/1999-4907/8/11/417
Paper.local.file	forests-08-00417-v2.pdf
Equations	(1) Over bark taper function: $$d_{ob} = c_1 \sqrt{H^{(k-b_1)/b_1}(1-q)^{(k-\beta)/\beta}\alpha_1^{I_1+I_2}\alpha_2^{I_2}}$$ where $q = h/H$ and $$\begin{cases} I_1 = 1 \text{ if } p_1 \leq q \leq p_2;\ 0 \text{ otherwise} \\ I_2 = 1 \text{ if } p_2 < q \leq 1;\ 0 \text{ otherwise} \end{cases}$$
Equations	(4) Under bark taper function $$d_{ub} = c_2 \sqrt{H^{(k-b_1)/b_1}(1-q)^{(k-\beta)/\beta}\alpha_1^{I_1+I_2}\alpha_2^{I_2}}$$ where $$c_2 = \sqrt{\frac{e_0 D^{e_1} H^{e_2-k/b_1}}{b_1(r_0-r_1)+b_2(r_1-\alpha_1 r_2)+b_3\alpha_1 r_2}}$$

##Article ID 5 : *(Sun, Liang, Liang, et al., 2016)* **Deriving {Merchantable} {Volume} in {Poplar} through a {Localized} {Tapering} {Function} from {Non}-{Destructive} {Terrestrial} {Laser} {Scanning}**

Student	Matteo Piccolo
Title.student	Deriving Merchantable Volume in Poplar through a Localized Tapering Function from Non-Destructive Terrestrial Laser Scanning
Authors.student	Yuan Sun, Xinlian Liang, Ziyu Liang, Clive Welham and Weizheng Li
Year.student	2016
Species	Populus × canadensis Moench cv.
Base.URL	http://www.mdpi.com/1999-4907/7/4/87/htm
Paper.local.file	forests-07-00087.pdf
Equations	$$d^2 = a_0 D^{a_1} \frac{(H-h)^{a_2}}{H^{a_3}} \quad (2)$$ Schumacher and Hall, 1933 [23]

##Article ID 6 : *(Martins, Debastiani, Pelissari, et al., 2017)* **Estimativa do {Afilamento} do {Fuste} de {AraucÃ¡ria} {Utilizando} {TÃ©cnicas} de {InteligÃªncia} {Artificial}**

Student	NA

Title.student	Araucaria Stem Taper or Use of Artificial Intelligence Techniques
Authors.student	Ana Paula Marques Martins, Aline Bernarda Debastiani, Allan Libanio Pelissari, Sebastião do Amaral Machado, Carlos Roberto Sanquetta
Year.student	2017
Species	Araucaria angustifolia
Base.URL	http://www.scielo.br/scielo.php?script=sci_arttext&pid=S2179-80872017000100152
Paper.local.file	2179-8087-floram-24-e20160234.pdf
Equations	NA

##Article ID 7 : *(Silva, Rodriguez, Caixeta Filho, et al., 2006)* **Fitting a taper function to minimize the sum of absolute deviations**

Student	NA
Title.student	Fitting a taper function to minimize the sum of absolute deviations
Authors.student	Lana Mirian Santos da Silva, Luiz Carlos Estraviz Rodriguez, José Vicente Caixeta Filho; Simone Carolina Bauch
Year.student	2006
Species	Eucalyptus
Base.URL	http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-90162006000500007
Paper.local.file	31406.pdf
Equations	NA

##Article ID 8 : *(Arnoni Costa, GuimarÃ£es Finger, Schneider, et al., 2016)* **{FUNÃ‡ÃfO} {DE} {AFILAMENTO} {E} {SORTIMENTOS} {DE} {MADEIRA} {PARA} {Araucaria} angustifolia**

Student	NA
Title.student	Taper function and timber assortments for Araucaria angustifolia
Authors.student	Emanuel Arnoni Costa, César Augusto Guimarães Finger, Paulo Renato Schneider, André Felipe Hess
Year.student	2016
Species	Araucaria angustifolia
Base.URL	http://www.redalyc.org/articulo.oa?id=53446151016
Paper.local.file	53446151016.pdf
Equations	NA

##Article ID 9 : *(Souza, Chassot, Finger, et al., 2008)* **Modelos de afilamento para o sortimento do fuste de {Pinus} taeda {L}**

Student	NA
Title.student	Taper function for assortment of Pinus taeda L. stem
Authors.student	Carlos Alberto Martinelli de Souza, Tatiane Chassot, César Augusto Guimarães Finger, Paulo Renato Schneider, Frederico Dimas Fleig
Year.student	2008
Species	Pinus taeda L
Base.URL	http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-84782008000900014
Paper.local.file	a14v38n9.pdf

Equations	NA

##Article ID 10 : *(Arias-Rodil, Castedo-Dorado, CÃ¡mara-ObregÃ³n, et al., 2015)* **Fitting and {Calibrating} a {Multilevel} {Mixed}-{Effects} {Stem} {Taper} {Model} for {Maritime} {Pine} in {NW} {Spain}**

Student	NA
Title.student	Fitting and Calibrating a Multilevel Mixed-Effects Stem Taper Model for Maritime Pine in NW Spain
Authors.student	Manuel Arias-Rodil, Fernando Castedo-Dorado, Asunción Cámara-Obregón, Ulises Diéguez-Aranda
Year.student	2015
Species	Pinus pinaster Ait.
Base.URL	http://europepmc.org/backend/ptpmcrender.fcgi?accid=PMC4668033&blobtype=pdf
Paper.local.file	pone.0143521.pdf
Equations	NA

##Article ID 11 : *(RodrÃguez, Lizarralde, and Bravo, 2015)* **Comparison of stem taper equations for eight major tree species in the {Spanish} {Plateau}**

Student	NA
Title.student	Comparison of stem taper equations for eight major tree species in the Spanish Plateau
Authors.student	Francisco Rodríguez1, Iñigo Lizarralde1 and Felipe Bravo
Year.student	2015
Species	Various
Base.URL	http://revistas.inia.es/index.php/fs/article/view/6229
Paper.local.file	6229-27194-1-PB.pdf
Equations	NA

##Article ID 12 : *(NÃ¡var, RodrÃguez-Flores, and DomÃnguez-Calleros, 2013)* **Taper functions and merchantable timber for temperate forests of northern {Mexico}**

Student	NA
Title.student	Taper functions and merchantable timber for temperate forests of northern Mexico
Authors.student	J. Návar, F. de Jesús Rodríguez-Flores, P.A. Domínguez-Calleros
Year.student	2013
Species	P.pseudostrobus, P. hartwegii, P. cooperi, P. ayacahuite, Q. spp, P. durangensis, P. leiophylla, P. teocote, P. arizonica, Quercus spp
Base.URL	http://www.editurasilvica.ro/afr/56/1/navar.pdf
Paper.local.file	navar.pdf
Equations	NA

##Article ID 13 : *(Ã–zÃ§elik and Dirican, 2017)* **Stem taper and volume models for natural cedar and {Taurus} fir mixed stands in {Bucak} {District}**

Student	NA

Title.student	Individual taper models for natural cedar and Taurus fir mixed stands of Bucak Region, Turkey
Authors.student	Ramazan Özçelik, Osman Dirican
Year.student	2017
Species	Cedrus libani A. Rich., Abies cilicica Carr.
Base.URL	http://dergipark.gov.tr/download/article-file/330518
Paper.local.file	10.17099-jffiu.290845-330518.pdf
Equations	NA

##Article ID 14 : *(Machado, Urbano, and ConceiÃ§Ã£o, 2005)* **ComparaÃ§Ã£o de mÃ©todos de estimativa de volume para {Pinus} oocarpa em diferentes idades e diferente iregimes de desbastes**

Student	NA
Title.student	Comparação de Métodos de Estimativa de Volume para Pinus oocarpa em Diferentes Idades e Diferentes Regimes de Desbastes
Authors.student	Sebastião do Amaral Machado, Edilson Urbano, Marcio Barbosa da Conceição
Year.student	2005
Species	Pinus oocarpa
Base.URL	https://pfb.cnpf.embrapa.br/pfb/index.php/pfb/article/view/242/193
Paper.local.file	242-1027-1-PB.pdf
Equations	NA

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Ã–zÃ§elik, R. and O. Dirican (2017). "Stem taper and volume models for natural cedar and Taurus fir mixed stands in Bucak District". In: *Ã„Â°stanbul ÃfÅ"niversitesi Orman FakÃfÂ¼ltesi Dergisi* 67.2, pp. 1-1. ISSN: 0535-8418. DOI: 10.17099/jffiu.290845.

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