Scientific papers on 'Taper functions'

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Introduction

2018 Forest Inventory course - Collective students' work

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.

Results of students' searches

Article ID: 1 *(Scolforo et al. 2018)*

Student	NA
Authors	
(student registration)	Scolforo, H.F., McTague, J.P., Raimundo, M.R., Weiskittel, A., Carrero, O., Scolforo, J.R.S.
Title	
(student registration)	Comparison of taper functions applied to eucalypts of varying genetics in Brazil: Application and evaluation of the penalized mixed spline approach
Title	
(Zotero)	Comparison of taper functions applied to eucalypts of varying genetics in {Brazil}: application and evaluation of the penalized mixed spline approach
Species	Eucalypts
Code	*cod*

Article ID: 2 *(Warner et al. 2016)*

Student	Angelo Manca
Authors	
(student registration)	Andrew J. Warner, Monton Jamroenprucksa, Ladawan Puangchit,
Title	
(student registration)	Development and evaluation of teak (Tectona grandis L.f.) taper equations in northern Thailand,
Title	
(Zotero)	Development and evaluation of teak ({Tectona} grandis {L}.f.) taper equations in northern {Thailand}
Species	Tectona grandis L.f.

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$$d_{ub} = (H - h)\,(S + \beta_3\,(h - h_1) + D_{ub}/\,[H - h_1]) \quad (2)$$

where $S = \beta_1\beta_2^2\,(h_1 - h)\,/\,[(1 + \beta_2 h)\,(1 + \beta_2 h_1)\,(1 + \beta_2 H)]$

$\beta_1 = c_0 + c_1 H + c_2 H^2 + c_3 (D_{ub}/10)^2$

$\beta_2 = d_0 + d_1 H + d_2/H$

$\beta_3 = f_0 + f_1 H + f_2/H + f_3\,(D_{ub}/10) + f_4 (D_{ub}/10)^2$

Code

Article ID: 3 *(Tang et al. 2016)*

Student	NA
Authors	
(student registration)	Xiaolu Tang,César Pérez-Cruzado,Lutz Fehrmann,Juan Gabriel Álvarez-González,Yuanchang Lu,and Christoph Kleinn,
Title	
(student registration)	Development of a Compatible Taper Function and Stand-Level Merchantable Volume Model for Chinese Fir Plantations
Title	
(Zotero)	Development of a {Compatible} {Taper} {Function} and {Stand}-{Level} {Merchantable} {Volume} {Model} for {Chinese} {Fir} {Plantations}
Species	Cunninghamia lanceolata [Lamb.] Hook

Taper function:

$$d = c_1\sqrt{H^{(k-b_1)/b_1 \bullet (1-q)^{(k-\beta)/\beta} \bullet \alpha_1^{I_1+I_2} \bullet \alpha_2^{I_2}}} \quad (2)$$

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.

$$\beta = b_1^{1-(I_1+I_2)} \bullet b_2^{I_1} \bullet b_3^{I_2},\ a_1 = (1-p_1)^{\frac{(b_2-b_1)\bullet k}{b_1 \bullet b_2}},\ a_2 = (1-p_2)^{\frac{(b_3-b_2)\bullet k}{b_2 \bullet b_3}}$$

$$r_0 = (1 - h_{st}/H)^{\frac{k}{b_1}},\ r_1 = (1-p_1)^{\frac{k}{b_1}},\ r_2 = (1-p_2)^{\frac{k}{b_2}}$$

$$c_1 = \sqrt{\frac{a_0 \bullet D^{a_1} \bullet H^{a_2 - k/b_1}}{b_1 \bullet (r_0 - r_1) + b_2 \bullet (r_1 - \alpha_1 \bullet r_2) + b_3 \bullet \alpha_1 \bullet r_2}}$$

Code

Article ID: 4 *(Corral-Rivas et al. 2017)*

Student	Maria Chiara Ruggiu
Authors	

(student registration)	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.
Title (student registration)	Compatible System for Predicting Total and Merchantable Stem Volume over and under Bark, Branch Volume and Whole-Tree Volume of Pine Species“
Title (Zotero)	Compatible {System} for {Predicting} {Total} and {Merchantable} {Stem} {Volume} over and under {Bark}, {Branch} {Volume} and {Whole}-{Tree} {Volume} of {Pine} {Species}
Species	Pinus cooperi, Pinus durangensis
Code	(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 $$\begin{cases} I_1 = 1 \text{ if } p_1 \le q \le p_2;\ 0 \text{ otherwise} \\ I_2 = 1 \text{ if } p_2 < q \le 1;\ 0 \text{ otherwise} \end{cases}$$

Article ID: 5 *(Sun et al. 2016)*

Student	Matteo Piccolo
Authors (student registration)	Yuan Sun, Xinlian Liang, Ziyu Liang, Clive Welham and Weizheng Li
Title (student registration)	Deriving Merchantable Volume in Poplar through a Localized Tapering Function from Non-Destructive Terrestrial Laser Scanning
Title (Zotero)	Deriving {Merchantable} {Volume} in {Poplar} through a {Localized} {Tapering} {Function} from {Non}-{Destructive} {Terrestrial} {Laser} {Scanning}
Species	Populus × canadensis Moench cv.
Code	$$d^2 = a_0 D^{a_1}\frac{(H-h)^{a_2}}{H^{a_3}} \quad (2)$$ Schumacher and Hall, 1933 [23]

Article ID: 6 *(Martins et al. 2017)*

Student	NA
Authors (student registration)	Ana Paula Marques Martins, Aline Bernarda Debastiani, Allan Libanio Pelissari, Sebastião do Amaral Machado, Carlos Roberto Sanquetta
Title (student registration)	Araucaria Stem Taper or Use of Artificial Intelligence Techniques

Title (Zotero)	Estimativa do {Afilamento} do {Fuste} de {AraucÃ¡ria} {Utilizando} {TÃ©cnicas} de {InteligÃªncia} {Artificial}
Species	Araucaria angustifolia
Code	*cod*

Article ID: 7 *(Silva et al. 2006)*

Student	NA
Authors (student registration)	Lana Mirian Santos da Silva, Luiz Carlos Estraviz Rodriguez, José Vicente Caixeta Filho; Simone Carolina Bauch
Title (student registration)	Fitting a taper function to minimize the sum of absolute deviations
Title (Zotero)	Fitting a taper function to minimize the sum of absolute deviations
Species	Eucalyptus
Code	*cod*

Article ID: 8 *(Arnoni Costa et al. 2016)*

Student	NA
Authors (student registration)	Emanuel Arnoni Costa, César Augusto Guimarães Finger, Paulo Renato Schneider, André Felipe Hess
Title (student registration)	Taper function and timber assortments for Araucaria angustifolia
Title (Zotero)	{FUNÃ‡ÃfO} {DE} {AFILAMENTO} {E} {SORTIMENTOS} {DE} {MADEIRA} {PARA} {Araucaria} angustifolia
Species	Araucaria angustifolia
Code	*cod*

Article ID: 9 *(Souza et al. 2008)*

Student	NA
Authors (student registration)	Carlos Alberto Martinelli de Souza, Tatiane Chassot, César Augusto Guimarães Finger, Paulo Renato Schneider, Frederico Dimas Fleig
Title (student registration)	Taper function for assortment of Pinus taeda L. stem
Title (Zotero)	Modelos de afilamento para o sortimento do fuste de {Pinus} taeda {L}
Species	Pinus taeda L
Code	*cod*

Article ID: 10 *(Arias-Rodil et al. 2015)*

Student	NA
Authors	
(student registration)	Manuel Arias-Rodil, Fernando Castedo-Dorado, Asunción Cámara-Obregón, Ulises Diéguez-Aranda
Title	
(student registration)	Fitting and Calibrating a Multilevel Mixed-Effects Stem Taper Model for Maritime Pine in NW Spain
Title	
(Zotero)	Fitting and {Calibrating} a {Multilevel} {Mixed}-{Effects} {Stem} {Taper} {Model} for {Maritime} {Pine} in {NW} {Spain}
Species	Pinus pinaster Ait.
Code	*cod*

Article ID: 11 *(Rodríguez et al. 2015)*

Student	NA
Authors	
(student registration)	Francisco Rodríguez1, Iñigo Lizarralde1 and Felipe Bravo
Title	
(student registration)	Comparison of stem taper equations for eight major tree species in the Spanish Plateau
Title	
(Zotero)	Comparison of stem taper equations for eight major tree species in the {Spanish} {Plateau}
Species	Various
Code	*cod*

Article ID: 12 *(Návar et al. 2013)*

Student	NA
Authors	
(student registration)	J. Návar, F. de Jesús Rodríguez-Flores, P.A. Domínguez-Calleros
Title	
(student registration)	Taper functions and merchantable timber for temperate forests of northern Mexico
Title	
(Zotero)	Taper functions and merchantable timber for temperate forests of northern {Mexico}
Species	P.pseudostrobus, P. hartwegii, P. cooperi, P. ayacahuite, Q. spp, P. durangensis, P. leiophylla, P. teocote, P. arizonica, Quercus spp
Code	*cod*

Article ID: 13 *(Özçelik and Dirican 2017)*

Student	NA
Authors	
(student registration)	Ramazan Özçelik, Osman Dirican
Title	

(student registration)	Individual taper models for natural cedar and Taurus fir mixed stands of Bucak Region, Turkey
Title	
(Zotero)	Stem taper and volume models for natural cedar and {Taurus} fir mixed stands in {Bucak} {District}
Species	Cedrus libani A. Rich., Abies cilicica Carr.
Code	*cod*

Article ID: 14 *(Machado et al. 2005)*

Student	NA
Authors	
(student registration)	Sebastião do Amaral Machado, Edilson Urbano, Marcio Barbosa da Conceição
Title	
(student registration)	Comparação de Métodos de Estimativa de Volume para Pinus oocarpa em Diferentes Idades e Diferentes Regimes de Desbastes
Title	
(Zotero)	ComparaÃ§Ã£o de mÃ©todos de estimativa de volume para {Pinus} oocarpa em diferentes idades e diferente iregimes de desbastes
Species	Pinus oocarpa
Code	*cod*

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Arias-Rodil, M, F. Castedo-Dorado, A. CÃ¡mara-ObregÃ³n, et al. (2015). "Fitting and Calibrating a Multilevel Mixed-Effects Stem Taper Model for Maritime Pine in NW Spain". En. In: *PLOS ONE* 10.12. Ed. by M. Reigosa, p. e0143521. ISSN: 1932-6203. DOI: 10.1371/journal.pone.0143521. URL: http://dx.plos.org/10.1371/journal.pone.0143521.

Arnoni Costa, E, C. A. GuimarÃ£es Finger, P. R. Schneider, et al. (2016). "FUNÃ‡ÃfO DE AFILAMENTO E SORTIMENTOS DE MADEIRA PARA Araucaria angustifolia". PortuguÃfÂ©s. In: *CiÃfÂªncia Florestal* 26.2, pp. 523-533. ISSN: 0103-9954. URL: http://www.redalyc.org/articulo.oa?id=53446151016 (visited on lug. 28, 2018).

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Machado, S. d. A, E. Urbano and M. B. d. 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". In: *Pesquisa Florestal Brasileira* 2005.50 (jan./jun.). URL: https://pfb.cnpf.embrapa.br/pfb/index.php/pfb/article/view/242/193.

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